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PLATE 5

Holboell's Grebes (Colymbus grisegena holböllii) carrying nest material, Lake Ontario, 1944. From a painting by John A. Crosby.

A NESTING OF THE CAROLINA WREN

BY MARGARET M. NICE AND RUTH H. THOMAS[1]

THE Carolina Wren, *Thryothorus ludovicianus*, charming, conspicuous, and widely distributed as it is throughout southeastern United States, has been much neglected by life-history students. And this in spite of the fact that it often leaves its characteristic woods habitat to nest about buildings and even on porches. In 1946 we were able to watch one nesting of this species from the arrival of the female to the leaving of the young.

The male, which had been banded March 27, 1941, near North Little Rock, Arkansas, had lost a mate in late March 1946. On April 18 we noted him bringing three wisps of grass and placing them under the eaves of the sleeping porch. (Typically, in Ruth Thomas' experience, a male does not build until mated.) On April 19 we first saw his new mate, an unbanded bird.

Building the Nest

In the afternoon of April 19, the new female came onto the porch, then flew to the base of a nearby oak; the male suddenly dropped down from his perch, hitting her and giving a loud song; she answered with the typical "screech" of the female Carolina. Later we discovered them nest-hunting in a shed to the south; we removed the grape baskets that were stored there and hung one (partially closed with a shingle) on the sleeping porch.

The next morning (April 20), at 7:55, both came to the porch; they entered the basket, gave little notes, then left. For a while both carried material into the tool-shed, some 25 yards to the east. At 8:25 the female returned to the basket and gave little notes, while her mate sang nearby. At 8:32 she brought the first load of material and gave notes in the basket; at 8:33 the male entered and left again; the female came with material, and he followed with a load. She had carried 5 loads and he 6 when, at 8:38, they were frightened away by a boy coming to the porch. They then made a number of trips with leaves, and the male tried to insert a large twig but dropped it; at 9:11 they left. We scattered dead leaves and other nesting material in front of the porch and placed lichen and cat's fur from the nest of a Carolina Chickadee, *Parus carolinensis*, on a nearby chair.

At 11:50 the male brought material, gave "nest notes" in the basket, and sang loudly. Four minutes later, both were investigating under the eaves. The male then went to the basket without a load, and his

[1] Although the study as a whole was cooperative and largely based on R. H. T.'s previous experience with the Carolina Wren gained through many years of intensive banding, observation, and recording, M.M.N. is responsible for the larger part of the observations recorded here (covering the period April 16-May 28, 1946) and, in the main, for the writing of the paper.

mate carried a dead leaf in and out again. He then drove off a male Bewick's Wren, *Thryomanes bewickii,* with a *scat* note and sang loudly. We saw nothing more of them that day until 3:15, when the male made two trips to the basket with empty bill. While inside, he uttered tiny squeaks; his mate did not appear. We did not know whether they had finally selected the basket for their nest.

At 6:50 a.m. on April 21 the male came to the basket without a load, entered, gave nest notes, then sang once from the edge; his mate joined him; both entered and stayed for about 3 minutes. Then he brought two loads. At 7 o'clock she carried in a large load and gave many notes inside—*fit fit fit fit;* he joined her, bringing nothing, left, and returned twice with loads. She came with dead grass, but went onto the roof. He then brought 8 loads of moss and bits of cypress bark from the lawn chair; she gathered some grass but dropped it. The male carried 3 more loads, and at 7:17 she brought more material. By 7:20 he had brought 18 loads, she 4.

Both birds continued working, and between 8 and 10 o'clock the major part of the nest was constructed. The male carried 107 loads and his mate 54—a total of 161 loads—in the first hour; he carried 98 and she 50—a total of 148—in the second hour, making an average during the 2 hours of 1.7 trips per minute for the male and 0.9 trips a minute for his mate. The dead leaves, oak catkins, dry grass, and the few twigs that made up the nest were all gathered in the immediate vicinity—on the ground or from the roof. The female often chattered when she met her mate and often twittered in the basket. Once the male was scratching around in the nest and singing inside the basket; afterward he sang loudly 3 times on the ivy-covered oak, 10 feet from the nest; his mate came out from the ivy leaves; he sang again, then brought more loads and gave 2 songs in the nest. Whenever a Blue Jay, *Cyanocitta cristata,* appeared, he stopped work and *churred*—the note he used when one of the dogs stood on the porch beneath the basket.

Building zeal began to lessen, especially in the male. From 10:38 to 11:08 he brought 23 loads, she 18; from 12:20 to 12:35 he brought 2, she 5; from 1:23 to 1:38 he carried 4, she 8; and from 2:30 to 3:30 he made 3 visits, bringing a load on only one; and she 13, bringing material all but once. Little more happened that day until between 6:00 and 6:15 p.m., when he made 2 visits, bringing nothing, and she made 6 trips with material.

Although we were watching for "courtship displays," we saw little. At 12 noon the female gave a long trilling cry on the oak branch; the male went to her, and they may have copulated; he then sang, his feathers fluffed. Twice in the afternoon we saw him displaying before her with outspread wings, uttering a kind of *chur,* but she made no response. At 6:15, as they were foraging on the ground, he gave her a caterpillar, which she accepted without any demonstration. (On March

28, 1937, Mrs. Thomas saw a male Carolina Wren offering a caterpillar to his mate; the birds at that time were either building or about to build.)

The nest was practically completed during this great burst of energy the morning of April 21; the male's nest-building urge was satisfied, but that of the female did not entirely disappear until May 6, the eighth day of incubation.

On April 22 the pair arrived at 5:30 a.m., the female going into the basket, the male going onto the top. In the next hour and a half she came 15 times, bringing hair and fine grass. He visited the nest 3 times, sang a good deal, and displayed to her once on the wood-pile, but she gave no response. During the rest of the morning they paid a few visits to the basket, he empty-billed, she with more lining material; each gave soft notes at times in the basket.

The next morning (April 23) they arrived at 5:26 and gave little notes in the nest; in an hour and a half she carried in 14 bits of lining, while he made 3 more visits. From 7:45 to 8:45 she carried 2 loads and was very vocal in the nest. At 9:05 she was nowhere to be seen, and apparently the male was seeking her. After vigorous singing from the lawn chair and nearest oak branches, he went into the basket, gave a tiny note, and came out. He repeated this twice, the last time staying in for 2 minutes; then he sang loudly from the nearest oak and from other perches. One visit from the female early in the afternoon was our only other record for the day.

On April 24, after a heavy downpour late in the night, the Wrens did not arrive until 7:09 a.m.; the male went into the basket, while his mate scolded for 2 minutes with her bill full of dry grass; later they both entered. At 8:07, she brought a tiny root, and at 8:16 a few more small roots. These were the only visits during a continuous watch of over 5 hours.

Egg Laying

On April 25, 6 days after her arrival and 5 days after the start of nest-building, the female laid her first egg. The times of her early morning departures and arrivals for the 5 days of egg-laying are given in Table 1.

From April 26 to 29 the female's absences from the nest showed a striking regularity, ranging between 23 and 26 minutes. When laying, she stayed on the nest from 30 to 64 minutes at a time; the two shortest periods and also the next to the longest were terminated by her departure in response to her mate's singing nearby. She arrived at the nest to lay her first egg some 9 minutes earlier in the day than on the following days. (In Finland, at latitude 63° N., in early June, with sunrise at about 2:30 a.m., one Willow-Warbler, *Phylloscopus trochilus*, went on the nest to lay at about 3:00 a.m. and another at 4:00 a.m., both going on the nest slightly earlier from day to day—Kuusisto,

TABLE 1

CAROLINA WREN, NORTH LITTLE ROCK, ARKANSAS
EGG LAYING

1946 April	Sky	Sunrise	Left nest	Came to lay	Minutes off	Left again	Minutes on
25	Clear	5:26		5:43		6:24	41
26	Clear	5:25	5:33	5:56	23	6:30*	30
27	Clear	5:23	5:28*	5:54	26	6:25*	31
28	Clear	5:22	5:29	5:54	25	6:58	64
29	Cloudy	5:21	5:26	5:51	24	6:47*	56
Average		5:23	5:29	5:52	24.5	6:37	44

* Apparently left in response to male's signal song.

1941:34.) On April 25 the Carolina Wrens came to the nest at 5:43 a.m.; the female entered the basket and gave loud chatterings inside; the male flew to the edge and looked down, whereupon his mate redoubled her notes. The night of April 25 was the first she spent in the basket.

Except for April 28, when we left for the day at 10:25, one of us was on the porch much of the time every day; on April 25 the female brought material 3 times during the morning after laying her egg and stayed from one to 28 minutes; on April 26 she did not reappear after 6:30 a.m., and on April 27 she made but one visit. The male came to the basket 2 or 3 times each morning; twice, on April 26 and April 28, he brought caterpillars; one he ate himself, since his mate was not at home. His first visit on April 28 was very early—5:18 a.m.; he looked down into the basket and gave 2 small notes, but getting no response he left; 11 minutes later his mate hopped onto the edge of the basket and flew off.

INCUBATION

During the 14 days of incubation we watched the nest from 2 to 14 hours a day. Unfortunately, owing to the amazingly long periods spent by the female on the nest and her quietness in leaving, as well as to our reluctance to disturb her by examining the nest basket, some data, especially for periods on the nest, are lacking from our records. Six hours, for instance, on May 10 and 11 yielded only one complete record (for a period off the nest) but did give data on the male's feeding of his mate.

At least 7 times during the first 8 days of incubation (April 29-May 6) the female brought catkins or a few hairs on her return to the nest. About half of her departures were apparently in response to her mate's singing nearby; twice she followed him after he had fed her.

Several times he brought food when she was not there; once, when he offered her a morsel a minute after her return, she did not accept it. He was most intent on feeding her early in the morning. On May 7 and 8 his zeal increased but waned in the next 3 days, only to increase again on the morning of the fourteenth (last) day of incubation, when he made 13 trips in 5 hours 30 minutes before the hatching of the first egg (about 1:43 p.m.).

Feeding of female by male during incubation was reported in the Carolina Wren by Wight (1934), but Laskey recorded none during the two nestings that she observed in July and August (1946b:62; and 1948). Laskey suggests that feeding may occur during early nestings only, as with the Cardinal, *Richmondena cardinalis* (Laskey, 1944:42). "Courtship feeding" seems never to have been reported for the Winter —or European—Wren, *Troglodytes troglodytes*, or for the House Wren, *Troglodytes aëdon*, both thoroughly studied species; nor for the marsh wrens, *Telmatodytes* and *Cistothorus* (Welter, 1935; Walkinshaw, 1935); but it does occur to some extent in the Rufous-browed Wren, *Troglodytes rufociliatus* (Skutch, 1940:308), Bewick's Wren (Miller, 1941:96; Laskey, 1946a:40), and Northern Cactus Wren, *Campylorhynchus brunneicapillus couesi* (Anders Anderson, letter).

The results of 92 hours of watching are summarized in Table 2. We obtained two all-day records as follows: May 2, the fourth day of incubation, dawned clear; the male gave his first song at 4:40 and came to the nest with food at 5:20; 8 minutes later the female left. His second offering, brought at 6:00, he ate himself, for the female had not returned. His third and last visit came at 5:13 p.m. The female's periods off and on the nest lasted the following numbers of minutes (periods off being in parentheses): (39), 45, (61), 147, (38), 119, (58), 119, (61), 85, (22). The 6 periods off the nest averaged 46.5 minutes; the 5 periods on the nest, 103 minutes. That evening, which was rainy, the male went to roost at 6:26 p.m., the female went to the nest for the night at 6:42. The morning of May 7 was cloudy. The male gave his first song at 4:52 and sang 188 times during the first hour. His first visit to the nest occurred at 5:27, and his mate left at 5:35; he brought food 8 times between 6:00 and 12:33 and once more at 6:38. The female's periods away from and on the nest were as follows: (20), 68, (30), 129, (25), 112, (17), 174, (36), 99, (20), 53, (18). The 7 periods off the nest averaged 24 minutes; the 6 on the nest 106 minutes. Thus, though the periods on the nest were as long as those of May 2, the periods off the nest averaged little more than half as long; 62 per cent of the daylight hours were spent on the nest on May 2, and 79 per cent on May 7, with mean temperatures of 75° F. and 64° F., respectively, being on May 2, 8° above normal, on May 7, 4° below. On May 7, a clear evening, the female went to the nest for the night at 6:55 p.m.

The most striking feature of the female's behavior during incubation was the very long periods spent on and off the nest. We never knew the female to spend less than half an hour on the nest; one session lasted nearly 3 hours (174 minutes), and the average for the whole fortnight was 86 minutes. Periods off the nest averaged 31 minutes in length.

A marked lengthening of the periods on the nest appeared on the fourth day (May 2); during the first 3 days, 11 periods averaged 65.6 minutes; during the last 11 days, 25 periods averaged 95.2 minutes. Two or more periods on the nest were observed on 6 of the days between May 2 and May 12; the daily average for 5 of these days ranged from 103 to 108 minutes, while on the other day 3 periods averaged 95 minutes. Shortening of the periods off the nest was evident from the fifth day (May 3): 19 periods in the first 4 days averaged 39 minutes, 27 periods in the last 10 days averaged 25 minutes. This shortening was more marked from the sixth day of incubation (May 4) and coincided with a drop in temperature, the mean temperature of the first 5 days averaging 69° F. (3° above normal), of the last 9 days, 63.6° F. (4.6° below normal); 64.5 per cent of the time was spent on the nest during 40.5 hours of observation on the warmer days, 80 per cent during 51.5 hours of observation on the cool days.

Very long periods on and off the nest were also recorded by Laskey (1946b:62; 1948:107) in her study of two Carolina Wrens in Nashville, Tennessee. She watched one nest July 10 and 11, 1946, for 6 hours and 14 minutes; the female incubated 43 per cent of the time, staying on the nest from 15 to 87 minutes and off the nest from 41 to more than 85 minutes; temperatures were high (up to 94° F.). She watched the other nest for 67 hours during incubation, from July 21 to August 2, 1946; temperatures were normal, averaging 78.6° F., and daily fluctuations were small, ranging from 3° above normal to 3° below; 63 per cent of the time was spent on the nest; 33 periods on the nest ranged from 12 to 137 minutes, averaging 57.9 minutes, and 43 periods off the nest ranged from 9 to 58.5 minutes, averaging 33.5 minutes. Thus periods off the nest averaged almost the same as those of our Carolina Wren in Arkansas, but periods on the nest averaged a third shorter; whereas on the average both birds stayed off the nest a half hour at a time, the periods on the nest averaged for the Tennessee female about an hour (57.9 minutes), for the Arkansas female, about an hour and a half (86.1 minutes). Due to the comparative uniformity of the weather during Laskey's second study, it was not possible (as it was in our Arkansas study) to trace a difference in rhythm correlated with temperature changes; also, in Laskey's study, the periods on and off the nest were about the same during the first 4 days as during the last 10.

Periods spent on and off the nest by these three Carolina Wrens are very much longer than those of most small passerines that have so

TABLE 2

CAROLINA WREN, NORTH LITTLE ROCK, ARKANSAS
INCUBATION

Date (1946)	Hours watched	Feedings by male	Periods on the nest			Periods off the nest			Time on nest (%)	Temperature (mean)	USWB
			No.	Length (minutes)		No.	Length (minutes)				
Apr. 29	7.5	4	4	31–102	(63)	4	11–84	(43.5)	59.1	66°F.	(0)
30	4	4	2	31–74	(52.5)	3	13–43	(25.3)	67.5	66°	(0)
May 1	11	3	5	46–112	(73)	6	22–74	(37.5)	62	70°	(+4°)
2	**14**	**3**	**5**	**45–147**	**(103)**	**6**	**22–61**	**(46.5)**	**62.4**	**75°**	**(+8°)**
3	4	1	1	74		2	23–49	(36)	70.5	70°	(+3°)
4	6	3	3	89–104	(95)	3	23–28	(25.3)	78.9	62°	(−5°)
5	2	1	1	56		2	26–31	(28.5)		60°	(−7°)
6	4.5	3	2	75–134	(104.5)	2	26–41	(33.5)	76	71°	(+3°)
7	**14**	**10**	**6**	**53–174**	**(106)**	**7**	**17–36**	**(24)**	**79.4**	**64°**	**(−4°)**
8	3.5	12	2	86–145	(105)	3	15–19	(17)	81.9	62°	(−6°)
9	6	5	1	43		3	8–35	(23.7)		64°	(−4°)
10	3.5	2				1	19			70°	(+1°)
11	2.5	5								59°	(−10°)
12	9.5	37*	4	43–145	(108)	4	14–32	(25.5)	81.1	60°	(−9°)
Total period	92	93†	36	31–174	(86.1)	46	8–84	(31.2)	73.4	65.6°	
First 5 days	40.5	15	17	31–147	(71.3)	21	11–84	(39.3)	64.5	69°	(+3°)
Last 9 days	51.5	78‡	19	43–174	(99.6)	25	8–41	(24.4)	80.3	63.6°	(−3.8°)

Mean lengths of periods on and off the nest and degrees of departure from normal temperature are given in parenthesis in the respective columns. Data for 2 all-day records (May 2 and 7) are given in boldface type.

* 13 times in 5.5 hours before hatching of the first young (1:43 p.m.).
† 69 times in 86 hours before hatching of the first young.
‡ 45 times in 50 hours before hatching of the first young.

far been studied. For 21 individuals, of 8 species, listed by Nice (1943: 221, Table XXIII), average periods on the nest ranged from 12 to 49 minutes, with a median of 29.8; average periods off the nest ranged from 5.7 to 16.5 minutes, with a median of 8.5. The Northern Cactus Wren also has short periods of attentiveness and inattentiveness (Anders Anderson, letter).[2] The number of times the incubating female leaves the nest each day varies among 11 species from 11 to 90, with a median of 21 (Nice, 1943:220). The Carolina Wren of this study left the nest 6 and 7 times (on the 2 days of complete records). The House Wren leaves 27 to 43 times a day (Baldwin and Kendeigh, 1927:213). The Oven-bird, *Seiurus aurocapillus*, seems to be the only passerine so far studied with an incubation rhythm at all comparable with that of the Carolina Wren; 26 full-day recordings by the itograph, involving 4 incubation periods of 3 females, show that the birds left the nest from 5 to 13 times a day, the median being 8.5 times. Periods on the nest averaged from an hour to nearly 3 hours; periods off from 16 to 22 minutes. There seemed to be considerable variation in incubation rhythm, even in the same bird, from year to year (Hann, 1937; Nice, 1938).

Relationship Between Temperature and Incubation Rhythm

As illustrations of relationship between incubation rhythm and temperature, let us examine a number of cases for which sufficient data have been obtained: the Carolina Wren of this study; Laskey's Carolina Wren in comparison with ours; 3 Willow-Warblers, *Phylloscopus*, whose incubations were recorded mechanically (Kuusisto, 1941); 3 Song Sparrows, *Melospiza melodia*, during 4 incubations (92 hours—Nice, 1937:123, Table IX); 5 Song Sparrows, whose incubations (representing 29 days) were recorded mechanically by Baldwin and Kendeigh (Nice, 1937:124); a Barn Swallow, *Hirundo r. rustica*, for which 5 full-day observations were recorded (De Braey, 1946:166 ff.; Nice, 1947); 3 Oven-birds in 4 incubations (covering 26 days), recorded by itograph (Hann, 1937; Nice, 1938).

For all except one of the 17 birds involved in the above studies, the percentage of time spent on the nest decreased with increasing temperature. Thus, our Carolina Wren spent 80 per cent of the daylight hours incubating when the temperature averaged 63.6° F. and 64.5 per cent when it averaged 69° F. In Laskey's study the Carolina Wren spent 63 per cent of the time on the nest at a mean temperature of 78° F., whereas the female of our study incubated 73 per cent of the whole period at a mean temperature of 66° F. The Willow-Warbler (*Phyllo-*

[2] Courtney Jones (1939. "Rock Wrens at Wupatki," *Southwestern Natl. Monuments, Monthly Repts.*, Supplt. for July, pp. 69–72) found that a Rock Wren [*Salpinctes obsoletus*] averaged 18 minutes on the nest, 15 minutes off. Harold Heath (1920. "The Nesting Habits of the Alaska Wren," *Condor* 22:49–55) observed four nests of the Alaska Winter Wren (*Troglodytes troglodytes alascensis*) and found that periods on the nest ranged from 18 to 21 minutes, periods off, from 2 to 5 minutes.

scopus), incubating during warm weather (with maxima of 80.6° and 82.4° F.) in 1937 spent less time on the nest than did the two females incubating during cool weather (with maxima of 64.4° to 68° F.) in 1938 (Kuusisto, 1941:diagrams 11, 15). One of my Song Sparrows (K7) spent 80 per cent of the time on the nest at a mean temperature of 57° F.; K3 spent 71 per cent of the time on the nest at a mean temperature of 69° F.; and K2 spent 79 per cent at a mean temperature of 55° F., 75 per cent at a mean temperature of 70° F. As temperature increased (48° to 80° F.), there was a consistent decrease (77 per cent to 72 per cent) in the percentage of time Baldwin and Kendeigh's Song Sparrows spent on the nest, with the exception of one bird that incubated 79.5 per cent during an average mean temperature of 75° F. The time spent by the Barn Swallow on the nest shows a consistently descending percentage (74 per cent to 66.5 per cent) with an increase in mean temperature (58.6° to 71° F.). Average temperatures during the Oven-birds' incubation ranged from 59° to 80° F., percentage of time on the nest from 85 and 86 per cent to 73 per cent.

In all cases the length of periods off the nest was correlated with temperature. This was true of our Wren, whose periods off the nest decreased markedly in length during the cool weather of the latter part of incubation (although then another factor may have been involved, namely, increased attachment to the eggs). In the cool weather of 1938, 92 per cent of the Willow-Warblers' absences were very short (less than 10 minutes); in the warm weather of 1937 this was true of only 69 per cent of the absences. The length of periods off the nest of my Song Sparrows averaged 6 minutes (for K7), at a temperature of 57° F., and 8 minutes (for K3), at a temperature of 69° F.; K2 stayed off 7.8 minutes, at an average temperature of 55° F., and 9 minutes, at an average temperature of 70° F. One of Baldwin and Kendeigh's Song Sparrows showed a consistent adjustment to temperature, her periods off the nest increasing regularly from 4.1 minutes, at 43° F., to 7.5 minutes, at 54° F., and all showed a regular *average* increase of periods off the nest, from 5.7 minutes, at 48° F., to 16.5 minutes, at 80° F. The Barn Swallow's periods increased consistently from 2.5 minutes, at 58.6° F., to 5.8 minutes, at 71° F. One Oven-bird (No. 15) stayed off 16 minutes at 59° F. in 1935, and 22 minutes at 63° F. in 1936; the other two averaged 20 minutes at 80° F.

The number of periods off the nest per day decreased with rising temperature, for Baldwin and Kendeigh's Song Sparrows, from 33 to 15; for the Barn Swallow, from 79 to 46; for Oven-bird No. 15, from 9.2 to 5.8. For the Willow-Warblers, periods off the nest were much fewer in 1937 than in 1938 (Kuusisto, 1941:45); Kuusisto gives actual figures for only one nest in 1938 (p. 41); the bird left 27, 27, 30, and 35 + times in one day.

Correlative with the lessening of the number of absences with increasing temperature, is the increase in the length of periods on the nest: for the northern Ohio Song Sparrows a consistent increase from 19.3 minutes to 42.4 minutes; for the Barn Swallow, from 7.2 to 11.9 minutes; for Oven-bird No. 15, from 96 to 170 minutes.

Carolina Wrens and Song Sparrows studied at Columbus, however, decreased the length of periods on the nest with increasing temperature. The Wren of our study averaged 98 minutes on the nest at 64° F. and 71 minutes at 69° F.; Laskey's Wren averaged 57.5 minutes at 78° F.; my Song Sparrows averaged 30.5 minutes at 57° F. (K7), 20 minutes at 69° F. (K3), 30 minutes at 55° F. and 27 minutes at 70° F. (K2).

To summarize: in colder weather the birds increased the percentage of time spent on the nest, shortening the periods off the nest. Ten birds of four passerine species (5 Song Sparrows in northern Ohio, Oven-bird, Barn Swallow, 3 Willow-Warblers) increased the length of periods on the nest, decreasing the number of periods (both on and off). Five birds of two species (3 Song Sparrows in central Ohio and 2 Carolina Wrens) decreased the length of periods (both on and off), increasing the number. It will be noted that in all cases periods off the nest were shorter in cold weather than in warm, while the number of periods (both on and off) differs according to whether the periods on the nest lengthen or shorten.

Care of the Young

Except for giving small notes when fed by her mate, the female Carolina had been quiet in the nest during incubation. On May 12, at 1:43 p.m., she started to chatter, much as she had done when arranging material in the nest, and 16 minutes later she again chattered. The male brought food 6 times between 1:43 and 2:50, when the female left the nest. We then found that the first young had hatched, and there was no sign of the shell. The female had left at 9:54, at which time there were still 5 eggs; she returned at 10:25; unfortunately, no one was watching the nest from 12:40 to 1:15, so we cannot be sure that she did not take a brief vacation, but she may have stayed on continuously for 4 hours and 25 minutes. The male had been feeding his mate 2.2 times an hour on this morning—in contrast to 0.7 times an hour during the previous 81.5 hours of observation, but after 1:46 p.m. he fed his mate 4 times an hour. He showed excitement by loud singing and by flipping his wings. At 5:47 p.m. his mate was absent, and he fed the nestling directly for the first time. The next day 3 more eggs had hatched by 10:00 a.m., and the last one hatched between 12:10 and 4:46.

Two full-day records were obtained: on May 15, when the young were 2 and 3 days old; and on May 22. In addition, we watched from one to 11 hours every day except May 20 while the young were in the nest. A summary of the results is given in Table 3.

TABLE 3

CAROLINA WREN, NORTH LITTLE ROCK, ARKANSAS
CARE OF FIVE YOUNG

Date (1946)	Hours watched	Feedings						Brooding periods (mean lengths)		Time on nest (%)	Temperature (mean) USWB
		Per hour			Total						
		by ♂	by ♀	by ♂ & ♀	by ♂	by ♀	by ♂ & ♀	On	Off		
May 12	4*	6.0	0	6.0	24	0	24	95.7	23.7	83.6	60°F.
13	4*	3.5	0.5	4.0	14	2	16	54.0	27.7	69.3	62°
14	4.5	4.2	0.2	4.4	19	1	20	57.2	19.5	85.2	70°
15	**14**	**3.6**	**0.9**	**4.5**	**51**	**12**	**63**	**34.9**	**30.5**	**51.4**	**66°**
16	4	3.0	2.3	5.3	12	9	21	17.0		4.7	72°
17	3	5.7	2.0	7.7	17	6	23	0		0	72°
18	3	5.7	2.7	8.4	18	8	26	0		0	70°
19	3	5.0	4.0	9.0	15	12	27	0		0	68°
21	3*	3.7	5.3	9.0	11	16	27	0		0	62°
22	**14.3**	**5.4**	**5.8**	**11.2**	**77**	**83**	**160**	**0**		**0**	**64°**
23	1	6.0	8.0	14.0	6	8	14	0		0	70°
24	11	4.0	10.1	14.1	44	111	155	0		0	76°
25	6	5.7	11.1	16.8	34	67	101	0		0	70°
26	1	7.0	11.0	18.0	7	11	18	0		0	66°
Total period	77.8	4.5	4.5	9.0	352	346	695				67.7°
First half†	38.5	4.1	1.0	5.1	158	38	193	49.8	27.4	72.4	67.4°
Second half	39.3	5.0	7.8	12.8	194	308	502	0		0	68°

The first young hatched about 1:43 p.m. May 12; 3 more by 10 a.m., and the last by 4:46 p.m., May 13.
Data for 2 all-day records (May 15 and 22) are given in boldface type.

* Watched in afternoon only.
† For brooding: first four days.

For the first 3 days (May 13 to 15) the female behaved much as she had while incubating; she brooded much and fed little. The percentage of daylight hours spent on the nest during these days (72 per cent) was as much as during incubation (73 per cent), and the average length of periods off was much the same (27 minutes now, 31 minutes before). The chief difference lay in the *number of periods off*, which became twice as numerous (12 on the all-day session of May 15, in contrast to 6 and 7 on May 2 and 7), and in the *length of periods on* (50 minutes now, 86 minutes before). (The explanation of the lower percentage of brooding on the cool day of May 13, in comparison with the mild day of May 14, probably lies in the time the observations were made, in the afternoon on May 13, in the morning on May 14; 64 per cent of the morning hours were spent on the nest on May 15, 40 per cent of the afternoon hours.)

The female spent the nights on the nest up to May 18, when the young were 6 and 7 days old; we did not check on this point on May 19 and 20, but on May 21 the female did not come to the nest while we watched from 7:02 to 7:30 p.m., by which time it was very dark. On the following evening, she entered the box at 7:15 p.m., evidently for the night, since she had not left by 7:30. Laskey's female did not brood the young after they were 4 days old despite unseasonably cold weather.

The female showed an almost continuous increase in her rate of feeding, from 0.5 times an hour (on May 13) to 11 times an hour (on May 25). The male had a burst of enthusiasm upon the hatching of the first egg on May 12 and brought food to the nest 6 times an hour, but his rate dropped the next day to 3.5 times an hour, then gradually increased to 5.7 times an hour (on May 17 and 18). On May 21, for the first time, the female outdid her mate; in 18 hours during May 24 to 26 (the last 3 days of nest life) she brought more than twice as many meals as her mate. Omitting the afternoon of May 12, the rate for the *pair* increased consistently from beginning to end, from 4 to 18 times an hour, averaging 9 times an hour for the whole period. When the young were 2 and 3 days old, 63 meals, or 12.6 for each, were brought during the day; when the young were 9 and 10 days old, 160 meals, or 32 per nestling, were brought (assuming that only one bird was fed on each trip, a matter on which we could make no observations). The hourly rate of feeding during the first half of nest life was 5.1, during the last half, 12.8, or two and a half times as high—the same proportional increase as found at 7 Song Sparrow nests (Nice, 1943:231). Beginning with May 16 both parents brought some very large insects.

During the first week our Carolina Wrens showed the same rate (number of trips per hour) in feeding their 5 young as did Lasky's pair in feeding 3 young: 5.1 trips per hour, or one trip per bird for our brood, 1.7 trips per brood for hers. During the last 5 days of nest life,

Laskey's pair made 6.1 trips per hour (only 2 young were then present), whereas our pair, during the last week, averaged 12.8 trips per hour. For the whole period, Laskey's pair averaged 2.2 trips per hour per young, our pair averaged 1.8.

In keeping with the slow pace of the incubation rhythm, both these pairs of Carolina Wrens fed the young rather infrequently. The hourly rates *per brood* of 8 passerine species (Nice, 1943:235) ranged from 39.7 (Great Tits, *Parus major*) to 11.4 (Song Sparrows); 2 other species—American Robins, *Turdus migratorius*, at 6.5, and Oven-birds at 3.7—showed a lower rate than our Wrens. The rates per *nestling* for the 8 species ranged from 8.4 (Wire-tailed Swallows, *Hirundo smithii*) to 3.1 (Song Sparrows); the Robins received 1.7 and 2.1 meals per hour, the Oven-birds 0.8 to 1.2.

The first sac of excreta we saw carried away was one on May 15 (by the male). On May 22 (a full-day observation) the male carried off 12; the female, 16—a total of 28 for the day, or 18 per cent of the number of feedings. During the 11 hours' observation two days later, the male took 4 sacs and the female, 25—again 18 per cent of the number of feeding trips.

Leaving the Nest

On May 18 we had first heard notes from the young at some of the feedings. They squeaked when hammering began nearby but not when the basket was touched. The next day they responded with sounds to the shutting of the porch door and to a scratch on the basket. The female now began giving her *tinkle*, denoting mild alarm, at Blue Jays. These *tinkles* were often heard from then on, and the male *churred* more and more vigorously (at times, 70 notes a minute) at the Jays, which never paid the slightest attention. During the last few days, as the female assumed the larger share of the task of feeding the young, the male's role as policeman became more pronounced.

By May 24 the young had become very noisy at meals, and occasionally they gave the location note—*pfit*. The next day they called at times in response to their father's songs. Between 5:00 and 6:00 p.m. the female fed the young 11 times, the male 3 times, but twice he came to the basket without food and merely looked in.

On May 26, when the young were 13 and 14 days old, the male's first feeding of the day came at 4:48 a.m., the female's at 5:01; both fed the young industriously during the first hour. The young were silent at first, but at 6:09 responded to each of the male's songs with location notes. At 6:43 a nestling was up on the edge of the basket, but promptly hopped back; this performance was repeated at 7:20. The male then came to the basket *without food* 4 times and peered in; once he gave a note, then flew to the west and sang loudly, while the young scrambled about inside the basket. He was apparently *trying to get the young to leave.*

By 7:38 a.m., 4 young Wrens were up on the edge. The female now arrived, scolded, and fed the one young inside; she scolded again, and all disappeared inside. The next minute 3 clambered up again; the female went to the basket without food, hopped in, and all followed her. The male joined them without food, then started to sing from the nearest oak. At 7:42, all 5 young climbed out on the edge, and 2 flew to the shelf under the eaves. The female went into the basket with food, came out, and fed one of the young on top; she then hopped into the basket, giving coaxing notes, and 3 young followed her. The male *churred* in the oak and the female *tinkled*. The male fed a young Wren in the basket and took away a fecal sac. One fledgling flew from the shelf and landed on the floor of the porch. The female went to the basket, then to the young Wren under the eaves, giving coaxing notes, returned to the basket, and fed a young Wren inside. Unlike the male's, her efforts seemed to be *directed toward getting the young back into the nest*.

The bird on the floor called *pfit pfit*. With some young in the basket and some fluttering about, the scene became considerably confused. Both parents fed young at 7:53 a.m., the female at 7:59, 8:03, and 8:04. Now it appeared that the female, as well as the male, was trying to lure the young from the nest and its vicinity; she went to the eaves, giving coaxing notes, while the male went into the basket, which then contained only one young Wren. At 8:13 both parents entered the basket, the female carrying an insect; the young Wren followed her out, but the mother did not feed it. All 5 young started to fly about, whereupon we decided to band them. The male scolded vigorously and fluttered to within a few feet of one of us, then left.

We banded 3 young and put them in a trap, and they began to call; the male appeared and *churred*. The fourth fledgling screamed when caught, whereupon the male flew near with slow wing movements—a mild form of "distraction display," which seems not to have been previously recorded for the Troglodytidae.

The female flew in and out of the porch, giving the "tolling" notes; she returned with an insect, went to the empty basket, then left. Seven minutes later, the male came to the feeding shelf some 15 feet from the young in the trap; the young began to call. The female arrived again with food, going to the empty basket, then hurrying past the trap, calling. The male came 3 times to the basket, looked down at the young in the trap, then left; the female came 4 times, each time hurrying past the trap, calling loudly. At 9:03 she arrived with food, went to the basket, called, alighted on top of the trap, returned to the basket, and left. We then put the trap containing the young under a large drop trap at the side of the house; the male *churred* vigorously, but the female came directly to the young to feed them; we caught and banded her. We released the young at once; they flew some 15 feet and landed well.

The Wrens moved down the hill into the woods, and we did not see the young again. The male returned occasionally, but the female was seen only once—on June 18, when she and the male were examining the nest basket. A pair, apparently juveniles, took posession of the hill. In late July, the male occasionally appeared to chase them with much excited singing, but he was not seen after July 28 although he was watched for until December 18.

Early Morning and Evening Activities

The beginning and end of activities of both male and female were closely correlated with light. Records for 19 mornings are given in Table 4. The male's awakening songs on 8 clear (one slightly misty) mornings came 27 to 42 minutes (average: 33 minutes) before sunrise; on 2 cloudy mornings, 21 and 27 minutes (average: 24 minutes); and on 2 rainy mornings, 14 and 21 minutes (average: 17.5 minutes). Civil twilight at 35° latitude occurs at 26 to 28 minutes before sunrise at this time of year (Kimball, 1916:617); thus, the first song on clear mornings averaged 6 minutes before civil twilight. The male did not sing as early as the Mockingbird (*Mimus polyglottos*), Robin, Purple Martin (*Progne subis*), Mourning Dove (*Zenaidura macroura*), Cardinal, or the Catbird (*Dumetella carolinensis*), but was always earlier than the Bewick's Wren, Chimney Swift (*Chaetura pelagica*), and Orchard Oriole (*Icterus spurius*).

Three of the male's first visits to the nest on the days the female was laying took place about an hour after his first song, although one (on April 28) must have come about 25 minutes after (see Table 4). During incubation his 4 first visits of the day occurred about half an hour after his first song, whereas 3 first visits to feed the young came at 6, 8, and 18 minutes after. Thus a progressively greater bond to the nest is evident.

The female came to the nest at about sunrise when building and when feeding young. Her very late arrival (7:09 a.m.) on April 24 may have been due to a heavy downpour that began about 2:00 a.m. and lasted well into the morning. During the period of laying, she left the nest from 5 to 8 minutes after sunrise (returning in 23 to 26 minutes to lay). On 3 mornings in the early part of incubation she left the nest 10 to 12 minutes after sunrise; on 2 mornings during the latter half she left 22 to 23 minutes after. We obtained only one record while she was brooding the young: on May 15 she left 29 minutes after sunrise. Here an increasing bond to the nest seems evident after incubation started.

Until May 2 the male roosted in a fold of awning outside a west window of the house; the heavy rain falling that night may have discouraged him from returning. We did not know where he spent his nights after that except for May 25, when we found him once more in the awning. On 5 clear evenings he went to roost from 3 minutes be-

TABLE 4

CAROLINA WREN, NORTH LITTLE ROCK, ARKANSAS
EARLY MORNING ACTIVITIES

	Date (1946)	Sky	Sunrise	Male		Female	
				1st song	To nest	To nest	Left nest
Building	Apr. 22	cloudy	5:29			5:30	
	22	cloudy	5:28			5:26	
	24	cloudy*	5:27			7:09	
Laying	25	clear	5:26	4:44	5:44	5:43	
	26	clear	5:25	4:50	5:58		5:33
	27	clear	5:23	4:53			5:28†
	28	clear	5:22		5:18		5:29
	29	cloudy	5:21	4:54	6:05		5:26
Incubation	30	rainy	5:20	4:59			5:42
	May 1	misty	5:19	4:50	5:24		5:31
	2	clear	5:18	4:40	5:20		5:28
	7	cloudy	5:13	4:52	5:27		5:35
	9	clear	5:12	4:45	5:18		5:35
	10	cloudy	5:11				5:23†
Care of yg.	15	cloudy	5:07		5:05		5:36
	19	rainy	5:04	4:50			
	22	clear	5:02	4:30	4:36	5:09	
	24	cloudy	5:01			5:07	
	26	clear	5:00	4:30	4:48	5:01	

Time is Central Standard. Hours of sunrise from USWB at Little Rock.

* After heavy rain in latter part of preceding night.
† Called off the nest by male's loud song nearby.

fore sunset to 2 after; on 4 cloudy evenings, from 2 to 13 minutes before sunset; and on 2 rainy evenings, 26 and 28 minutes before. His last feedings of the young usually came around sunset on clear evenings. His last songs were less regular than his roosting or last feeding; only once did we hear him as late as 9 minutes after sunset—on May 23.

While there were eggs in the nest the female always came to the basket before sunset: 1, 2, 5, and 14 minutes before, on clear evenings; 12, 23, and 33 minutes before, on cloudy and rainy evenings. But after the young hatched she always returned after sunset: 4, 5, 7, 15, and 17 minutes after, on clear evenings; 8 and 10 after, on cloudy evenings. In fact, on 3 occasions she had difficulty in finding the basket in the

TABLE 5

CAROLINA WREN, NORTH LITTLE ROCK, ARKANSAS
EVENING ACTIVITIES

	Date (1946)	Sky	Sunset	Male			Female	
				Last song	Last fed yg.	To roost	To nest	Last fed yg.
Building	Apr. 20	cloudy	6:45	6:43		6:43		
	24	cloudy	6:48			6:44		
	25	cloudy	6:49			6:45	6:26	
	26	clear	6:50			6:52	6:49	
	27	clear	6:50	6:48		6:52	6:45	
	28	clear	6:51			6:53		
	29	rainy	6:52			6:26		
Incubation	30	cloudy	6:53	6:33		6:40	6:20	
	May 1	clear	6:53	6:47		6:50		
	2	rainy	6:54	6:24		6:26	6:42	
	5	clear	6:57	6:49			6:43	
	7	clear	6:58	6:53			6:56	
Care of yg.	12	clear	7.02		6:55		7:09	
	13	cloudy	7:03	7:02			7:13	
	14	clear	7:04				7:08	
	15	cloudy	7:04		6:49		7:12	
	16	clear	7:05		7:05			
	17	clear	7:06	7:08	7:07		7:23	
	18	clear	7:07	7:08	7:07		7:22	
	19	cloudy	7:08	7:02				
	21	clear	7:09	7:12	7:07			
	22	clear	7:10		6:43		7:15	
	23	clear	7:10	7:19	7:14			6:59
	25	clear	7:12	7:14		7:15		7:14

Time is Central Standard. Hours of sunset from USWB, Little Rock.

dark, having to alight on the stepladder below the nest on May 15, "stumbling about" on May 17, and on May 13 she could not find the nest on her return at 7:13 and went away. We turned on the light in our part of the porch. She came back at 7:16, scolding vigorously, flew to the ladder, made an unsuccessful attempt to reach the nest, and with the second try succeeded.

On the 5 days for which we have records of his last feedings and her final return to the nest, his feedings averaged 8 minutes before sunset; her returns, 8 minutes after. His day started earlier and ended earlier than hers. Evening activities for 24 days are shown in Table 5.

Summary

A nesting at North Little Rock, Arkansas, of a color-banded six-year-old male Carolina Wren, *Thryothorus ludovicianus*, mated with an unbanded mate, was watched some 250 hours, from the arrival of the female on April 19, 1946, to the leaving of the 5 young on May 26.

On April 20 the pair built sporadically in a tool-shed and in a basket on the sleeping porch; on April 21 they built most of the nest in the latter place between 8:00 and 10:00 a.m., the male bringing 205 loads, his mate 104. After that, his zeal diminished; in a total of 2 hours and 30 minutes of observation during the rest of the day he brought 30 loads, she 49. He brought no more material after that, but she carried in lining for 4 more mornings and continued to bring hair or grass blades occasionally until May 6, the eighth day of incubation.

Five eggs were laid, starting April 25, the female spending the night in the basket from that date. She left the nest 5 to 8 minutes after sunrise, returning in 23 to 26 minutes, and stayed on to lay from 30 to 64 minutes.

Incubation lasted 14 days and was performed entirely by the female. During 92 hours of observation she incubated 73 per cent of the time, staying on the nest from 31 to 174 minutes, averaging 86 minutes, and staying off the nest from 8 to 84 minutes, averaging 31. Two all-day observations gave the following results: fourth day, 5 periods on—averaging 103 minutes, 6 periods off—averaging 46.5 minutes; ninth day, 6 periods on—averaging 106 minutes, 7 periods off—averaging 24 minutes. The mean temperature of the first day was 8° F. above normal; on the second, 4° below normal. During the first 5 days, 64.5 per cent of the time was spent on the nest, with a mean temperature of 69° F.; periods on the nest averaged 71 minutes and periods off, 39 minutes. During the last 9 days, 80 per cent of the time was spent on the nest, with a mean temperature of 63.6° F.; periods on the nest averaged 99.6 minutes, periods off, 24.4 minutes.

Periods on and off the nest (as also with 2 Carolina Wrens observed by Laskey) were very much longer than those of most passerines so far studied. Females of 11 species left the nest 11 to 90 times a day —in contrast to the 6 and 7 times of the Carolina Wren of this study; the Oven-bird is the only passerine known to have an at all comparable rhythm.

In 7 studies of incubation in passerines it was found that the colder the weather, the more time spent on the nest and the shorter the absences of the parent. In some cases the absences were also more frequent, the periods on the nest shorter than in warm weather; in other instances periods on the nest were longer.

The male Carolina Wren fed his mate to some extent during nest building, egg laying, and incubation—93 times in the 92 hours of the incubation period.

The young hatched on May 12.

The nest was watched 77.8 hours during the nestling period, including 2 all-day sessions; when the young were 2 and 3 days old, the male made 51 trips, the female 12—together making 12.6 trips per young; when the young were 9 and 10 days old, the male made 77 trips, the female 83—32 trips per young. During the first week the parents together averaged 5.1 trips per hour; during the last, 12.8. The male increased his rate from 3.5 an hour to 7, the female from 0.5 to 11; the average of each for the whole period was 4.5. Excreta were carried off after 18 per cent of the feedings on May 22 and 24 (14 and 11 hours observation).

The young left at 13 and 14 days. After vigorous feeding during the first hour of May 26, the male began to lure the young out of the nest by visits without food and by loud singing nearby; the female, on the contrary, 3 times got the young back into the nest basket after they had left it. By 8:00 a.m. the female started luring the young out with coaxing notes and by refusing to deliver the food she carried.

When we caught a fledgling and it screamed, the male showed a mild form of distraction display; this is apparently the first record of this behavior in the Troglodytidae.

Activities of both male and female were closely correlated with light. The male's awakening song on clear mornings averaged 6 minutes before civil twilight. The female came to the nest about sunrise when nest building and feeding young; she left the nest, when laying, 7 to 8 minutes after sunrise. The male's day ended at about sunset except on 2 rainy evenings when he came to roost 26 and 28 minutes before sunset. The female behaved in much the same way while there were eggs in the nest, but after the young hatched her return to the nest was later, once 17 minutes after sunset; on 3 occasions she had difficulty in finding the nest in the dark.

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NOTES ON THE YELLOW-BREASTED SUNBIRD

BY NATHAN S. POTTER, III

BETWEEN February 15 and November 5, 1945, while stationed on Calicoan (a small, sparsely populated coral island at the southern tip of Samar in the Philippines), I made a few observations on the Yellow-breasted Sunbird, *Nectarinia jugularis jugularis*. Since very little has been recorded on the life history and behavior of this species, my data, although fragmentary, may be of value.

One of the most common birds of the island, whose avifauna I am describing in another paper, the Yellow-breasted Sunbird seemed to prefer palm groves that had little or no undergrowth other than scattered bushes or banana plants, but I often saw the sunbirds also at the edge of the forest and sometimes in the dense woods. During the first few months of my stay on the island, before the camp area was cleared for the construction of warehouses, and while our quarters consisted of tents, from 5 to 12 Yellow-breasted Sunbirds could be seen at any time in the very midst of the camp. They were apparently undisturbed by the presence of man and often permitted observation from a distance of only five or six feet. As the work of clearing the vegetation progressed in their preferred habitats, the birds became increasingly scarce until only one or two were seen in a week. Between November 1 and November 5, I saw them in large numbers in the palm areas that had not been cleared around the naval station at Guiuan on the southern tip of Samar about 10 miles from the center of Calicoan.

This sunbird is scarcely four and a half inches in length, short-tailed, and rather drab above (olive-green back and grayish-brown wings). Yet it is conspicuous and easily observed because of the brilliant chrome yellow of the underparts, which extends in the female over the chest, throat, and chin, though in the male these areas are glossy black, iridescent with bluish-green and dark purple. The bill is long, sharply pointed, and decurved; the legs set far back on the body. The flight is rapid and darting, with a quick wing beat.

Voice. The call note of the Yellow-breasted Sunbird was an undistinguished *tweet tweet;* in flight the sunbirds twittered like swallows; song, heard only from males, was a sharp clear *cheew-wee tweet tweet tweet tweet tweet*. I heard males singing during the full period that I was on the island.

Feeding habits. These sunbirds were particularly active in the center of the foliage of palm trees. An inspection of the yellowish flowering part of felled palms showed the presence of large numbers of diptera and hymenoptera. Small lizards were also much attracted to that

part of the trees. During the morning the sunbirds often fed quite close to the ground in leaves, vines, and low bushes; in the afternoon they were usually in the tops of palms.

Relations between males. On February 20, I saw two male sunbirds chattering and chasing each other in rapid darting flight; they then alighted about a foot apart, facing each other, on a low branch near a nest site. Both birds stretched their necks and pointed their bills straight upward, displaying their beautiful iridescent throats. In this position they slowly and stiffly turned their heads from side to side. During this activity, there was a female Yellow-breasted Sunbird quite near, and although the males seemed more interested in each other, they twice interrupted the display to give chase to the female. These activities lasted about 10 minutes, after which the two males flew off, leaving the female to herself. None of these three birds paid any attention to another pair of Yellow-breasted Sunbirds that were not more than 15 feet away during the whole time, nor did that pair pay any attention to them.

On one occasion a pair was in the top of a palm about 60 feet from a nest which had just been destroyed. Whenever a second male attempted to alight in the tree, he was immediately and viciously driven off by the first male.

Courtship. I first saw a male chasing a female on February 18. Lighting upon the ground 10 to 20 feet from where I was standing, the female lowered and spread her wings, quivering them and twittering, as juveniles do when begging for food, while the male probed her under tail coverts with his bill. An erratic darting flight followed, after which the birds returned to the same place, the female quivering her wings as the birds clasped bills and "wrestled" with each other. Then the male again began probing her under tail coverts with his bill. No attempt to copulate was apparent. The female flew off, with the male in pursuit. During this flight, which was fast, erratic in direction, and at a low height, the male apeared to be trying to grasp the female by, or under, the tail with his bill. Finally, at a height of about 40 feet, the male appeared to secure a good hold and both birds began tumbling downward, recovering about 3 feet from the ground and about 10 feet from where I was standing. They resumed flight without the male losing his grip and flew about for 6 to 8 seconds before the male let go and both birds dropped to the ground. After more bill-clasping and tail-probing, or biting, by the male, both birds flew off. All of these activities, lasting some 15 minutes, and accompanied by much twittering, took place within an area of approximately 4,000 square feet. The courting pair was apparently unnoticed by another pair which was building a nest 12 feet from where I was standing.

I again observed a sexual chase on March 4. After an exciting rapid chase around and about in a small area, the male flying from 3 to 18 inches directly behind the female, the birds perched quietly in a palm tree paying no attention to each other. Some sort of contact, possibly copulation, between a pair was observed after a similar flight on March 11, following which the male flew off singing.

Nesting. I discovered three nests while they were being constructed. Two were about three feet from the ground among the exposed roots of uprooted palm trees about 65 yards from the ocean in a partially cleared area, and the third was about three feet below the level of the ground, where a pit some 15 feet in depth and diameter had been dug in the sand, exposing the roots of a palm tree. This site was 15 feet from the other two nests.

I discovered the first nest about 8:00 a.m. on February 18 while the female was building. During a half hour of observation, the female made four trips to the nest, carrying palm fibers and grasses, as well as what looked like spiderweb strands. Before adding material to the nest she appeared to roll the substance in her bill as though putting saliva on it. At this time the general appearance of the nest was that of a few wind-blown grasses or fibers that had caught in the tangled roots of the tree. The bird approached the nest site from various directions but always lit on the branches of a bush or among the roots some three feet away before going to the nest. During this time the male followed the female very closely, but I did not see him carry any nesting material. After the female had added material to the nest, the male once or twice seemed to inspect the work closely before following her. No construction was in progress when I visited the site during the noon hour, but when I returned at about 4.00 p.m. the female was again at work, making about four trips with material during a half hour's observation. All this time the male was still in attendance. By February 24 the nest still appeared no more than a small clump of wind-blown grasses. On February 25 the nest had begun to take form, and an entrance hole was evident near the center of the side away from the sea. Work was still continuing on February 27, and by March 3 the nest was well-formed and quite similar in construction to that of the Baltimore Oriole (*Icterus galbula*) but was about three times as long and much wispier near the base, so that in general appearance it was still very like a clump of wind-blown grasses caught in the tree roots. The main structure of the nest was about 6 inches in diameter and about a foot in length. During this time neither bird had a favorite perch; both spent much time in the palms, bushes, tree roots, and on the ground, the male singing intermittently. There were usually other pairs of these sunbirds in the immediate vicinity, paying little attention to each other except when a single male would alight in a tree near a pair, and then the intruder would be driven off by the male of the pair.

On March 3 the nest was dislodged by a bulldozer pushing stumps into a pile around the nest site. I found the nest little damaged on the ground. I hung it in the same place it was before, but although it hung there for several days and a pair of sunbirds frequented the immediate vicinity, I never saw one visit the nest again, and no further work on the nest was ever evident. On March 11 I saw a female carrying nesting material in the vicinity, and on March 18 I discovered the new nest among the roots of the pile of stumps about 12 feet from the location of the former nest. It was nearly complete, with the entrance hole on the opposite side from that of the first nest. This nest was later abandoned, probably because it was adjacent to a truck-parking area, and throughout the day and night trucks were being parked within two feet of the nest.

On February 24 I discovered a nest in the sandy pit. It was nearly completed, and both birds were behaving as those described above. The pair in the pit and the pair found February 18 that built a nest in the stumps were working on their respective nests at the same time. I collected the female of the pair building in the pit about 7:30 a.m. on February 24 while she was working on the nest. Sticky strands of what appeared to be spiderweb about an inch and a half long hung from her bill. (The specimen is in the University of Michigan Museum of Zoology Collection. Eyes, bill, and feet black; ovary much enlarged.) At 12:30 p.m. on February 24 a pair was working on the nest in the pit, the female carrying nesting material to the nest and working on it. At the same time I saw the other pair at the nest in the stumps, so that the new female could not have been the one of that pair. A pair continued to work on the nest in the pit until it was destroyed by filling in the pit on March 3, after which, due to clearing activities, few birds were seen, and none carrying nest material.

Ogilvie Grant and Whitehead (1898. "On the Nests and Eggs of some rare Philippine Birds," *Ibis*, 1898:243) describe the nest of this species as a "neatly-woven pocket-shaped structure, with a roofed entrance at the side. It is composed of fibre, dead grasses, and other forest débris, bound together with spiders' webs, and lined with cotton and fine grass."

Perches and roosting behavior. Palm leaves and dead branches of trees or bushes varying from 5 to 40 feet in height from the ground were used as singing perches. Roosting perches were under the leaves of trees or bushes some 15 feet above the ground. As many as 12 or 15 Yellow-breasted Sunbirds would roost in an area of roughly 10,000 square feet. At the approach of evening there was a constant calling and twittering before the birds began to settle down. When it began to get dark, single birds and pairs would drop out of the general activity and alight on a branch within a foot or two of their perch, which they finally reached in two or three hops. After leaving the others to go

to their roost, the birds at first seemed tense and nervous, each spending a full minute or more before finally settling at their chosen spot for the night. The protecting leaves under which they hid motionless were three to five inches above the roosting branch, forming a horizontal roof. The birds usually roosted singly, but a pair was once seen roosting within a foot of each other. Members of a pair would occasionally roost about three feet apart; the male and female of one pair selected different trees, their perches about six feet apart and eight feet from the ground. On March 11 three or four pairs were roosting together, as pairs, in a dense growth of trees or bushes, perching 6 to 15 feet above the ground.

Although on March 16 and 17 I saw flocks of males and females roosting (the individuals fairly close to each other), almost all sunbirds roosting in the same area on March 24 were males. On this later date one male viciously attacked and drove away any bird that came within 20 feet of its perch, and attacked dragonflies and flying bugs that came within 3 to 5 feet. He did not molest a female sunbird only 6 feet away; when it was almost completely dark, the male quickly perched on a twig directly above and only 6 or 8 inches from the female: both birds being directly under leaves, as usual, and perched at a height of 18 to 20 feet from the ground in one of the larger trees in the area and just a few feet above the tops of most of the bushes. On March 26, a pair, presumably the same birds, were roosting on the same perches, with two other male birds roosting alone within 10 feet of them.

The same perches seemed to be used night after night: I saw male or female birds perched in the same place time after time, never a bird of one sex on a perch where I had previously seen a bird of the opposite sex. When the birds had once settled on their roosting perch, they became more reluctant to leave it as darkness increased. I could shoot at them three or four times with gravel in a sling-shot before they would leave; and they would return shortly afterward, dropping very quickly to their former perch or flying directly to it when it was very dark.

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SOME KANSAS BIRD RECORDS

BY M. DALE ARVEY AND HENRY W. SETZER

DESPITE the extensive ornithological collections that have been made in the vicinity of Lawrence, Douglas County, Kansas, kinds of birds unusual for the county, as well as for the State, continue to be found in the county from time to time. The following records of birds are mainly from a collection of mounted birds kindly lent by Ralph L. Montell, of Lawrence, Kansas, whose intelligent curiosity led him to save unusual specimens of wildfowl. We are grateful also to George H. Lowery, Jr., who checked the identification of the specimens suspected of being Mottled Ducks.

Colymbus auritus. Horned Grebe. The only occurrences of the Horned Grebe previously ascribed to Kansas are: one specimen "taken at Manhattan on September 30, 1878," and a specimen "in winter plumage in the Matthews collection at Wichita University . . . probably taken near Wichita, but . . . no data attached" (Long, 1935, MS).

According to the A.O.U. Check-list (1931:4), the interior winter records are "mainly from the region of the Great Lakes." A male, No. 54, Montell collection, was obtained 2.5 miles north of Lawrence, Douglas County, Kansas, on the mill pond of the Kansas River, on 16 November 1945, by Montell. This is the second Horned Grebe definitely known to have been taken in Kansas, and the first from Douglas County.

Aechmophorus occidentalis. Western Grebe. There are only three previously known occurrences of the Western Grebe in Kansas, the latest a bird (K.U. [University of Kansas Museum of Natural History] No. 6854) taken on 8 November 1901, "in Shawnee County," Kansas. Long (1935, MS) states that another mounted bird in the collections of the University of Kansas (No. 8653) was apparently taken in Douglas County. A second record from Douglas County (the fourth from the State) is provided by a male, No. 89, shot 2 miles north of Lawrence on the Kansas River, Douglas County, on 11 November 1947.

Anas fulvigula maculosa. Mottled Duck. In 1886, Goss (1886:6) recorded a female specimen of *Anas fulvigula* taken by him at Neosho Falls, Woodson County, Kansas, on 11 March 1876. He tells also of seeing three other ducks of this species, one of which he shot but apparently did not save. This identification was later amended by Goss (1891:58) to *Anas fulvigula maculosa.* The first edition of the A.O.U. Check-list (1886:115) and all subsequent editions, cited the

species as of casual occurrence in Kansas. Long (1940:437) stated that there were four specimens known from the State. These, apparently, were the following: K.U. No. 3503, ♀, taken in Douglas County on 6 October 1894, by an unknown collector; K.U. No. 4503, ♀, taken 31 March 1895, and without further data; Kansas State Teacher's College, uncatalogued, ♀, taken at Emporia on 12 March 1890, by A. L. Bennett; and finally the specimen, taken by Goss, referred to above and now in the Museum of the Kansas State Historical Society in Topeka. Re-examination of these specimens reveals that the two in the University of Kansas Museum of Natural History are typical examples of the Mallard, *Anas p. platyrhynchos*, and that the specimen at Emporia is a Gadwall, *Anas strepera*. The specimen taken by Goss was correctly identified. Because of the difficulties in identification of subspecies of this group in the field, the only acceptable record of occurrence of the Mottled Duck in Kansas is provided by Goss' specimen, and the subspecies must be regarded as an accidental straggler to the State.

Clangula hyemalis. Old-squaw. There are four previous records for this duck in Kansas, none of them from Douglas County (Long, 1935, MS). Two specimens, Nos. 40, ♂, and 54, ♀, Montell collection, were taken by Montell in Douglas County: No. 40 on Oxbow Lake, 3 miles northeast of Lawrence, on 7 December 1944, and No. 54 at a point 2.5 miles north of Lawrence, on the Kansas River, on 10 November 1945. These constitute the first records for Douglas County, and the fifth and sixth for Kansas. The A.O.U. Check-list (1931:54) does not mention the occurrence of this species in Kansas.

Somateria spectabilis. King Eider. This species, previously unrecorded from Kansas, can now be added to the list of Kansas birds as an accidental straggler on the basis of specimen No. 88, ♂, taken by Ralph L. Montell a mile east of Lawrence on the Kansas River on 24 November 1946. Bent (1925:119) states that a bird of this species has been taken at Keokuk, Iowa, in winter. Other casual occurrences are recorded from the Great Lakes. The identification of this specimen was kindly confirmed by Dr. Herbert Friedmann of the United States National Museum.

Gallinula chloropus cachinnans. Florida Gallinule. This bird, recorded by Long (1940:441), on the basis of one nest found in Coffey County, as resident in Kansas, has been discovered breeding in Douglas County. R. L. Montell found a nest of this bird and obtained the female (No. 80 in his collection) at Oxbow Lake, 3 miles northeast of Lawrence, on 22 May 1946. Two chicks from the nest were hatched artificially but were not preserved.

Caprimulgus carolinensis. Chuck-will's-widow. This bird is recorded as common in southeastern Kansas by Long (1940:445). Long (1935, MS) lists several birds seen and one specimen taken as far north as Douglas County. The A.O.U. Check-list (1931:173) lists the bird only from the southern part of Kansas. A male was taken by Arvey on 1 July 1948, one mile south of Clinton, Douglas County (K.U. No. 25026). One other bird was seen in the same locality, and several were heard. The bird had enlarged testes, and it would appear, from this and the number of birds present, that a breeding population existed here. This is the second specimen from Douglas County, the first having been taken by Long "7½ miles southwest of Lawrence on May 4, 1935."

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THE EDWARD HARRIS COLLECTION OF BIRDS

BY PHILLIPS B. STREET

RELATIVELY little has been written on the life of Edward Harris (1799-1863) in comparison with most other ornithologists of a hundred years ago. Until recently, the only intimate account that I was able to find was one in *Cassinia* for 1902 by George Morris, of Philadelphia, a great-nephew of Harris' friend, Dr. John Spencer. Many of Harris' letters and diaries were available to Morris, who mentions how important a part Harris played in the life of Audubon and in the ultimate success of his great undertaking of portraying the birds of America:

". . . were the whole truth told of the life and deeds of Edward Harris, the ornithological world at least would learn that it owed him a deep debt of gratitude. . . .

"It is true that in the fields of actual discovery his name is hardly known. It was as a friend and patron of scientific men that he made his influence felt—an influence exerted so quietly and modestly that its full force might easily be overlooked, especially at this late day. Of those who shared the friendships and reaped the bounty of Edward Harris, it is probable that no one was more deeply indebted to him than Audubon."

The most detailed account of Harris' life yet published has recently appeared (1947) in a paper of the Newcomen Society entitled "Edward Harris, Friend of Audubon," by Peter A. Brannon, of the Alabama State Department of Archives and History. William Ustick Harris, of Jackson, Alabama, a grandson of Edward Harris, has presented to the State of Alabama a collection of his grandfather's papers, journals, and relics, and it is from this material that Brannon prepared his interesting Harris biography.

My interest in Harris also stems from a collection—his bird collection—and a report of its discovery and contents is a necessary addition to the Harris story.

In October 1937, a Philadelphia contractor, Henry Makin, visited the office of my father, the late J. Fletcher Street, and, knowing my father's interest in birds, remarked that his parents had in their Moorestown, New Jersey, barn, stored in old boxes and trunks, a collection of birds which had once belonged to an Edward Harris. He said that Harris had given them to his father, together with several items of furniture, guns, and a mineral collection, in lieu of cash in settlement of a plumbing bill. The donor proved to be Edward Harris, 3rd, a son of the ornithologist.

My father journeyed to Moorestown and brought away twelve bushel baskets of birds, the skins varying in condition from good to exceedingly poor. The condition of many of the specimens was ex-

plained by the Makins. The birds were originally delivered in a large case of drawers; in due course Mrs. Makin decided the case would make a fine linen chest and demanded the removal of the skins. They were then placed in large packing boxes and an old trunk and removed to the loft of the barn. The capacities of the containers could not have been very generous, for Mr. Makin, Sr., advised my father that he had to press the birds down with his feet in order to close the lids. Then Henry Makin, growing up to young manhood and becoming interested in the collection of guns, decided to try them out, using the stuffed birdskins as targets . . . . Some 400 identifiable skins remain, representing 228 species, including many headless birds, separate heads, wings, and feet. It is regrettable that so many labels are missing and so many skins partially or wholly destroyed that a complete account of the collection is impossible.

Harris apparently collected relatively few of the specimens himself. Except for those traceable to the Audubon Missouri River Expedition, of which Harris was a member, all but a few of those skins which bear labels can be attributed to Spencer Baird, to John K. Townsend's Pacific Coast Expedition, or to Auguste Lefevre, a French naturalist. There is not a single skin whose label indicates that it was taken in the vicinity of Harris' New Jersey home.

Upon his return from Europe in 1836, Audubon wrote to Harris from New York and asked Harris to aid him in procuring permission to portray the birds which Townsend and Nuttall had collected in the Rockies and along the Pacific Coast. As Audubon stated, the collection had been entrusted to the Academy of Natural Sciences of Philadelphia; it contained "about forty new species of birds, and its value cannot be described." Townsend was still in the far west, and hence the Academy would not allow Audubon to make off with and describe the new birds. Audubon's efforts to gain permission being unsuccessful, Harris made an offer of five hundred dollars for the purchase of the entire collection, but this too was rejected. At length Audubon went to Boston and consulted Thomas Nuttall. Then, through the influence of Nuttall, who understood Audubon's desire to include the new birds in his great work, it was arranged that a committee should publish the descriptions in the Academy's "Journal" under Townsend's name and that Audubon be allowed to purchase the duplicates to paint and publish in his Giant Folio. Finally Audubon purchased some ninety-odd skins (F. H. Herrick, 1917. "Audubon the Naturalist," vol. 2, p. 154). I have found three skins from the Columbia River with Townsend's original labels; others, unlabelled, may be properly attributed to the same journey, among them five drepanids from the Hawaiian Islands, including the rare *Hemignathus lucidus hanapepe*.

Two of the Townsend skins are Snowy Egrets, *Leucophoyx thula*, taken at Walla Walla, Columbia River, on July 3 and August 13, 1836.

Townsend, in his journal of this trip ("Narrative of a journey across the Rocky Mountains to the Columbia River," 1839), includes in the appendix a "Catalogue of Birds Found in the Territory of the Oregon" and fails to list the Snowy Egret. Gabrielson and Jewett (1940. "Birds of Oregon," p. 109) list the Snowy Egret as a "rare straggler." These two specimens, therefore, are important early Oregon records.

There is also an unlabelled male Hermit Warbler, *Dendroica occidentalis*, which I am prepared to claim as one of the two cotypes of the species. This to me is the prize find of the entire collection. I realize the hazard of attempting to prove an unlabelled skin to be a type, yet I feel that the facts warrant the assertion. The points which I submit in evidence are these:

1. Townsend collected but a single pair of Hermit Warblers. They were taken "in a pine forest on the Columbia River on the 28th of May, 1835" (*Jour. Acad. Nat. Sci. Phila.*, 7, 1837:190).

2. There is no evidence that any of the specimens in the Harris collection from the Pacific Northwest are from any source other than the Townsend and Audubon Expeditions, and no *D. occidentalis* was taken on the latter.

3. The pair of Hermit Warblers shot by Townsend were among the birds given to Audubon to be figured in his Giant Folio and described in his Ornithological Biography (1839, vol. 5, p. 55), and the measurements given by Audubon in his description of that male compare with the measurements of mine, as follows:

Harris Collection		Audubon's	Harris Collection		Audubon's
Wing	70.0 mm. or 2 9/12 in.	2 8/12 in.	Culmen	8.75 mm. or 4/12 in.	4/12 in.
Tail	45.5 mm. or 1 9/12 in.	1 9/12 in.	Tarsus	17.25 mm. or 8/12 in.	8/12 in.

4. Neither cotype is in the U. S. National Museum, though so reported by Ridgway (1902. *U.S.Natl.Mus.Bull.* 50, pt. 2:569). H. G. Deignan states (*in litt.*, Nov. 6, 1947) that it is doubtful whether either cotype has ever been in that collection and suggests that my "male *Dendroica occidentalis* might be one of the original specimens."

In 1837 Audubon planned to explore the west coast of Florida in company with his son and Harris and to proceed as far as possible westward along the Gulf Coast into Texas. The Florida part of the expedition failed to materialize, due principally to the Seminole War, but the party did journey from Charleston through Georgia and Alabama to New Orleans, collecting for three weeks in that vicinity, and then proceeding to Galveston, Texas. There is a brief Harris journal of this trip in the papers now in Alabama, which includes a list of the birds shot and seen. Since the Audubon journal of this expedition was lost and never published, the Harris list fills a gap in the early Ameri-

can literature and is included here (Table 1). There is not a single specimen in the Harris collection bearing a label that indicates it was taken on this trip. Included among the birds, however, are the following (unlabelled): Swallow-tailed Kite (*Elanoides forficatus forficatus*), Mississippi Kite (*Ictinia misisippiensis*), Audubon's Caracara (*Polyborus cheriway auduboni*), Roseate Spoonbill (*Ajaia ajaja*), and Texas Kingfisher (*Chloroceryle americana septentrionalis*).

In December 1838, Audubon writes to Harris from London, "I feel a great pleasure in preparing a box of bird skins for you according to your desire." Whether or not any of the skins I hold are of that shipment I have no means of determining, but sixty skins, mainly shore and water birds, bear the French labels of "Aug^{e} Lefevre, Naturaliste, 24 rue Dauphine à Paris."

Audubon set out on his Missouri River Expedition in the spring of 1843. Accompanying him were his friend Harris (who, no doubt, more than paid his own way), John G. Bell, as taxidermist, Isaac Sprague, as artist, and Lewis Squires, as general assistant and secretary. During this journey, which lasted some eight months, Audubon kept a voluminous journal which was published in 1898 by his granddaughter, Maria Audubon, as a part of the work entitled "Audubon and His Journals"; and Harris (*Smiths. Inst. Fifth Ann. Rept.*, 1851:136–138) published a "List of Birds and Mammalia Found on the Missouri River from Fort Leavenworth to Fort Union . . . ." It was not until recently, however, that it became generally known that Harris also kept a diary (which compares favorably with Audubon's in every respect), and this is one of the Harris papers donated to the State of Alabama Department of Archives and History. A copy has been made from the original and sent to the Academy of Natural Sciences, and I have had the pleasure of studying it and comparing it with Audubon's. It has been of material assistance in the appraisal of this collection.

The party left Philadelphia on March 13 and arrived in St. Louis March 28. On April 4, all except Audubon left St. Louis for a few days' collecting in southern Illinois. They returned to St. Louis on April 13. In the Harris collection is a Meadowlark, *Sturnella magna*, which was taken on this side trip. The expedition proper got under way April 25, sailing on the *Omega*. Under date of May 2, Harris writes:

"Arrived at Independence this morning and took on 144 lbs of Tow which we had written for. We paid 25 cts. per lb. for it!!! Saw abundance of Parroquets today. Bell shot two at the first stopping place."

May 3: "Stopped at Fort Leavenworth to take on some cargo. Saw abundance of Parrokeets but did not procure any."

Under date of May 4, Audubon in his journal mentions the taking of seventeen Paroquets. There are five Louisiana Paroquets in the Harris collection, one taken May 3, two on May 4, and two undated but taken in the same locality.

There is much in the journal to indicate how careful an observer Harris was. Under May 4, for example, he writes:

"Missouri R. below black-snake Hills shot a Finch supposed to be new, it has a black head and throat, with a large patch of ash color on the cheeks and lore space running back to its neck. Shot a number of Parroquets today."

May 6: "Shot another Finch of the same species as that of Thursday in better plumage. Both Males. It corresponds in measurements with Townsend's Finch *F. Townsendii* which was described from a female bird and does not correspond—possibly this may be the male of that bird. We hope to find the female soon."

May 8: "Shot another of the rare Finchs."

Although there must have been considerable discussion over the new finch (for Harris certainly indicates his doubt), Audubon on May 17 writes in his journal: "I am truly proud to name it *Fringilla Harrisii*, in honor of one of the best friends I have in this world." The finch proved to be *Fringilla* [*Zonotrichia*] *querula* of Nuttall, but the vernacular name, "Harris' Sparrow" remains as a fitting memorial to the subject of this paper.

The journey from St. Louis to Fort Union, at the mouth of the Yellowstone River, took, according to Harris' entry for June 12, "some 17 hours less than 7 weeks and [we] arrived here earlier in the season by one day than has ever been done before and made a quicker passage than any other boat by about 15 days." In spite of the record speed made upriver, there was much time spent in collecting, observing the Indians, and buffalo hunting. None of my skins bear labels that positively indicate their being taken on the journey up to Fort Union, but by listing the birds mentioned in the Audubon and Harris journals as having been shot en route and comparing them with my skins, it is evident that many are the same.

One Western Meadowlark, *Sturnella neglecta*, bears the label "Missouri River 1843." It is interesting to note that both Harris and Audubon recognized this to be a new species even before a specimen had been secured. It was described by Audubon the following year. Harris remarks—

May 22: "We have seen a Meadowlark to-day which must prove a new one, its note is so entirely different from ours."

May 24: "We killed Red-shafted Woodpecker, Say's Flycatcher, Arkansas F., Lark Finch and several of the new Meadow Larks, for new I will insist it is notwithstanding that we cannot from the books establish any specific difference, yet it is totally different. But as we cannot set down these notes on paper, and the world will not take our words for it if we do, we must be content to refrain from publishing this good species unless we can on our return find a something about the bird

TABLE 1

FROM HARRIS' JOURNAL OF THE GULF COAST EXPEDITION

List of Birds procured and seen on Mr. Audubon's expedition from the S.W. Pass of the Mississippi to Galveston Bay in Texas between the 1st of April 1837 and 18th of May 1837.

Names of Birds	Dates last seen at respective places					
	S. W. Pass	Grand Terre	Cayo	Dernier Isle	Achafalaya Bay	Galveston Bay
	From Apr. 1 to 2	From Apr. 3 to 9				
Green Heron	Seen	Shot	Seen	Seen	Seen	Seen
Spoon-Bill Duck	Shot	Abundant	Seen	Seen	Seen	Seen
Gadwall Duck	Do	Shot. Abundant	Seen	Seen	Seen	Seen
Blue Winged Teal		Abundant				
Green Winged Teal	Do	Abundant	Seen	Seen	Seen	Seen
Black Duck. *A. obscura fusca*	Do	Seen	Seen	Seen	Seen	Seen
Mallard	Seen [cancelled?]	Seen	Seen	Seen	Seen	Seen
Wood Duck						Seen
Widgeon		Shot	X [?]	X	X	X
Pintail		X				X
Canvass Back	Seen					
Harlequin Duck	Seen					
Sanderling	X	X	X	X	X	X
Stilts						X
Oystercatcher		X	X	X	X	X
Plover. Piping		Shot	X	X	X	X
Wilson's P.		Shot. Abundant	X	X	X	X
Ring P.						X [cancelled?]
Black-bellied P.			X			X
Golden P.		Saw some flocks				
Turnstone		X	X	X	X	X
Great Blue Heron		X	X	X	X	X
Great White H.						
White Egret		X	X	X	X	X
Louisiana Heron		X	X	X	X	X
Night H.		X	X	X	X	X

Blue H.		X	X	X	X	X	
Am. Bittern						X	
Least Bittern		X	X	X	X	X	
Reddish Egret. *rufescens*			X [cancelled?]	X		X	
American Avocet				X		X	
Roseate Spoonbill						X	
Wood Ibis						X	
White Ibis						X	
Purple Ibis						X	
Long-billed Curlew		X	X	X	X	X	
Esquimaux Curlew Hudsonicus		[See below: 1]					
Red-backed Sandpiper		Shot	X	X	X	X	
Pectoral Sandpiper		X	X	X	X	X	
Tringa Pusilla		X	X	X	X	X	
" Minuta		Shot	X	X	X	X	
Knot		X	X [cancelled ?]	X [cancelled ?]	X [cancelled ?]	X	[?]
Semipalmated Sand		Shot	X	X	X	X	
Long-legged Sandpiper		[See below: 2]					
Willet	Abundant	Abundant in flocks	X	X	X	X	
Tell-tale	Abundant	Seen. Shot	X	X	X	X	
Yellow Shanks		Seen. Shot	X	X	X	X	
Spotted Sandpiper	X	X	X	X	X	X	
Bartram's Sandpiper		Abundant					
Great Marbled Godwit				X	X	X	
Red-breasted Snipe	Shot	Very abundant	X	X	X	X	
Wilson's Snipe		X			X		
Clapper Rail	Abundant	[See below: 3]	X	X	X	X	
Virginian Rail		X	X	X	X	X	
Sora		X	X	X	X	X	
Purple Gallinule						X	
American Coot						X	
Black Skimmer				X	X	X	
Cayenne Tern	Seen	Shot	X	X	X	X	
Marsh Tern	Shot	[See below: 4]	X	X	X	X	
Common Tern		Shot	X	X	X	X	
Sandwich Tern						X	

1. "Saw a flock and shot one."
2. "Shot. Saw a flock of about 20."
3. "Found the nest and eggs."
4. "Seen. Feed on insects. Very abundant and paired."

TABLE 1—*Continued*

FROM HARRIS' JOURNAL OF THE GULF COAST EXPEDITION

List of Birds procured and seen on Mr. Audubon's expedition from the S.W. Pass of the Mississippi to Galveston Bay in Texas between the 1st of April 1837 and 18th of May 1837.

Names of Birds	Dates last seen at respective places					
	S. W. Pass	Grand Terre	Cayo	Dernier Isle	Achafalaya Bay	Galveston Bay
	From Apr. 1 to 2	From Apr. 3 to 9				
Least Tern		X [cancelled?]	X [cancelled?]	X [cancelled?]	X [cancelled?]	X
Black Tern		X [cancelled?]	X [cancelled?]	X [cancelled?]	X [cancelled?]	X
Sooty Tern						X
Black-headed Gull	Shot	Shot	X	X	X	X
Common Gull	X	X	X	X	X	X
Herring Gull (argentatus)			X			X
Snow Goose						X
Goosander						X
Red-breasted Merganser						
White Pelican	X	Seen. Shot	X	X	X	X
Brown Pelican		Abundant	X	X	X	X
Florida Cormorant		Seen	X	X	X	X
Frigate Pelican		Seen	X	X	X	X
Snake-bird		X	X	X	X	X
Loon						X
Black-throated Diver			X			X
LAND BIRDS						
Turkey Buzzard	X	X	X	X	X	X
Carrion Crow	X	X	X	X	X	X
Peregrine Falcon	X	X	X	X	X	X
Sparrow Hawk						
Pigeon Hawk		Seen	X	X	X	
Fish Hawk		X	X	X	X	X
Mississippi Kite						X
Swallow-tailed Hawk	At New Orleans					X
Red-Shouldered Hawk		X	X	X	X	X
Marsh Hawk	Seen	Seen	X	X	X	X

Screech Owl		X	X	X		X
Virginian Owl						X
Barred Owl		X	X	X	X	X
Meadow Lark		X	X	X	X	X
Baltimore Oriole		Shot	X	X	X	X
Orchard Oriole		Seen	X	X	X	X
Red-winged Black	Seen. Abundant	Seen	X	X	X	X
Cow-bird		X	X	X	X	X
Reed-bird		Shot [cancelled?]	X	X	X	X
Boat-tailed Grakle	Seen in abundance	Seen				
Common Crow Blackbird	X		X	X	X	X
Rusty Grakle		X	X	X	X	X
Common Crow			X	X	X	X
Fish Crow	X					
Blue Jay			X	X	X	X
Crested Titmouse		X				
Carolina Titmouse			X	X	X	X
Cedar Bird	Saw many	X	X	X	X	X
Kingbird		X	X	X	X	X
Great Crested Flycatcher		X	X	X	X	X
Arkansa Flycatcher			X	X	X	X
Pewit Flycatcher		X	X	X	X	X
Wood Pewee		X	X	X	X	X
Small Pewee						
Redstart		X	X	X	X	X
Selby's Flycatcher						
Blue-Grey Flycatcher			X	X	X	X
Chat		X	X	X	X	X
Yellow-throated Vireo		X [?]	X	X	X	X
Solitary Vireo						
White-eyed Vireo		Procured	X	X	X	X
Red-eyed Vireo		X	X	X	X	X
Mockingbird		Shot. Abundant	X	X	X	X
Brown Thrush		X	X	X	X	X
Catbird		X	X	X	X	X
Wood Thrush		X	X	X	X	X
Hermit Thrush		X	X	X	X	X
Wilson's Thrush		X	X	X	X	X
Water Thrush		X	X	X	X	X
Louisiana Do.						

TABLE 1—*Continued*

FROM HARRIS' JOURNAL OF THE GULF COAST EXPEDITION

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Names of Birds	Dates last seen at respective places					
	S. W. Pass	Grand Terre	Cayo	Dernier Isle	Achafalaya Bay	Galveston Bay
	From Apr. 1 to 2	From Apr. 3 to 9				
Golden-crowned Do.		X	X	X	X	X
Summer Yellowbird		X	X	X	X	X
Hooded Warbler				X	X	X
Yellow-throated Warbler						X
Blackburnian W.				X		X
Chestnut Sided W.				X	X	X
Bay-breasted W.				X	X	X
Black & White Creeper			X	X	X	X
Pine Warbler						X
Blue-yellowbacked W.			X	X	X	X
Maryland Yellow-throat		Seen	X	X	X	X
Kentucky Warbler				X	X	X
Cerulean Warbler			X	X	X	X
Worm-eating Warbler						X
Prothonotary W.				X		
Blue-winged Yellow W.				X		
Golden-winged W.				X	X	X
Tennessee W.				X	X	X
Nashville W.				X		X
Roscoe's W.				X		
Carolina Wren		X	X	X	X	X
Short-billed Marsh Wren		X	X	X	X	X
Marsh Wren	Abundant	X	X	X	X	X
Blue bird		X	X	X	X	
Brown Lark		Seen here	X	X	X	X
Shore Lark						X
Black-throated Bunting					X	

Scarlet Tanager		X	X	X	X	X	X
Summer Red-bird		X	X	X	X	X	X
Indigo Bird		X	X	X	X	X	X
Nonpareil							X
Bay-winged Bunting		X	X	X	X	X	
Song Sparrow		X	X	X	X	X	X
Savannah Finch			Abundant	X	X	X	X
Yellow-winged Sparrow							
Chipping Sparrow		X	X	X	X	X	X
Swamp Sparrow		X	X	X	X	X	X
Sharp-tailed Finch							
Macgillivray's Finch							
Seaside Finch			Abundant	X	X	X	X
Towhee Bunting		X	X	X	X	X	X
Cardinal Grosbeak		X	X	X	X	X	X
Rosebreasted Grosbeak							X
Yellow-billed Cuckoo		X	X	X	X	X	X
Black-billed Cuckoo		X	X	X	X	X	X
Golden winged Wood.		X	X	X	X	X	X
Ivory-billed Woodpecker							
Pileated Woodpecker							X
Red-headed Woodp.							X
Red-bellied Woodpeck.							X
Yellow-bellied Woodpecker		X	X	X	X	X	X
Downy Woodpecker							X
Red-cockaded W.							X
Brown headed Nuthach							X
Humming bird		Seen	X	X	X	X	X
King Fisher		X	X	X	X	X	X
Purple Martin		Seen	X	X	X	X	X
Barn Swallow		Seen	X	X	X	X	X
White-bellied Swallow		Seen	X	X	X	X	X
Bank Swallow		X	X [?]	X	X	X	X
Chimney Swallow							
Night Hawk		X	X	X	X	X	X
Chuck Will's Widow							X
Whip-poor Will [cancelled]							X
Turtle Dove		X	X	X	X	X	X
Wild Turkey							X
Virginia Partridge							X
Pinnated Grous							X

more than we can now discover to establish a specific difference: Mais nous verrons."

June 20: "Sprague pointed out to me to-day a passage in Lewis & Clark's Journal with which we were unacquainted before but which goes far to confirm us in the opinion of the whole of our party that the Meadow Lark of this country is a new one, although we are not prepared without thorough examination and comparison to vouch for any of the differences mentioned by them with the exception of the notes of the bird about which there can be no question. It surprises me that Mr. Nuttall could have passed through this country without noticing this bird as he is so remarkably accurate in describing the notes of birds, indeed, he is almost the only man who has written the language of birds."

June 21: "I neglected last night to give the extract from Lewis and Clark's Journal about the Meadow Lark and will insert it here. It was on the 22nd of June while they were making the portage around the Great Falls of Missouri. They say 'There is also a species of Lark, much resembling the bird called the Old-Field Lark, with a yellow breast and a black spot on the croup, though it differs from the latter in having its tail formed of feathers of an equal length and pointed; the beak too is somewhat longer and more curved, and the note differs considerably.' "

I have seven skins bearing labels from Fort Union (western North Dakota), where the expedition maintained headquarters for two months.

The hybrid flicker (*"Picus ayresii"* of Audubon) and Sprague's Pipit (*Anthus spraguei*) were discovered on June 19. Harris writes: "This morning proved cold and rainy, and we did not go out, but it cleared off partially in the afternoon and Bell and I went out. Bell shot a Yellow-winged Woodpecker with a red stripe on the cheek (instead of a black one as in the common species). This is no doubt a new species to our Fauna, but I am inclined to think that I have somewhere seen a specimen of this bird and that it will not prove entirely new. As we returned home Bell and I fired together and shot a small bird which proves to be an entirely new Anthus or Titlark."

Audubon writes: "Harris and Bell have returned, and, to my delight and utter astonishment, have brought two new birds: one a Lark, small and beautiful; the other like our common Golden-winged Woodpecker, but with a red mark instead of a black one along the lower mandible running backward."

I have a Sprague's Pipit labelled "Fort Union, June 24/43." Cotypes are in the Academy of Natural Sciences and the United States National Museum. My specimen, taken the same day as the Academy's, is another cotype. Under date of June 24, Harris remarks: "In the afternoon Bell and Mr. Audubon rode down to the Fort again and on

their way killed more of the new Larks. Sprague was out and killed another, and what is of more consequence discovered its nest with 5 eggs, it is built of grass and placed in a hole in the ground so that the top of the nest is even with the surface, the eggs are thickly spotted of a chocolate color. Mr. Audubon remarked that it had very rarely happened to him to discover a new bird and to ascertain all its habits and to procure its nest and eggs in the course of a few days as has been the case with this bird."

The "new flickers" were the subject of much discussion in both journals, and Harris in particular has much to say about them under dates of July 1 and 2. "I would give a great deal to have Dr. Bachman here with a dozen specimens of Golden-wings from our side of the mountains," he remarks, "wouldn't we make a night of it?"

June 26: "Bell and I walked out with our guns and procured 3 Lazuli Finches." I have one taken on this date.

Much of the latter part of the stay at Fort Union was devoted to buffalo hunting, and the pages of Harris' journal include lengthy descriptions of these experiences. The Harris entry for July 16 tells the story of the most thrilling of these experiences:

"At this stage of the proceedings Owen discovered another Bull making his way slowly across the Prairie directly towards us. I was the only one of the party that had balls for his gun and I would have gladly claimed the privilege of running him but fearing that I might make out badly on my first trial run with my large gun which is altogether too large to run with (weighing eleven pounds) and supposing the meat could be carried to the Fort where it was wanted. I handed my gun and balls to Owen and Bell and I placed ourselves on eminence to view the chase. Owen approached the Bull who had continued to advance and was now about a quarter of a mile distant. The Bull either did not see him or did not heed him and they advanced directly toward each other until they were about 70 or 80 yards when the Buffalo started at a good run, and Owen's mare, which had already had two hard runs this morning had great difficulty in preserving her distance. Owen soon perceived this and applied the whip pretty freely he was soon within shooting distance and fired a shot which sensibly checked the progress of the animal and enabled him quickly to be alongside of him when he discharged the second barrel into his lungs, passing through the shoulder blade, which brought him to stand precisely in the position represented in Catlin's work of the wounded bull . . . . But to return to the Bull—Bell and I started now at top of our speed and as soon as we were within speaking distance called to Owen not to shoot again. The Bull did not appear to be much exhausted, but he was so stiffened by the shot in the shoulder that he could not turn quickly, taking advantage of which we approached him, as we came near he would work himself slowly around to face us and then make a

pitch at us. We then stepped to one side and commenced discharging our six-barrelled pistols at him with little more effect than increasing his fury at every shot. His appearance was now one to inspire terror, had we not felt satisfied of our ability to avoid him. I came however very near being overtaken by him through imprudence. I placed myself directly in front of him and as he advanced I fired at his head and then ran directly ahead of him, not supposing he was able to overtake me, but casting my head over my shoulder I saw Mr. Bull within three feet of me, prepared to give me a taste of his horns. The next moment I was off the track and the poor beast was unable to turn quick enough to avenge the insult. Bell now took the gun from Owen and shot him directly behind the shoulder blade, he stood tottering for a few moments with an increased gush of blood from the mouth and nostrils, fell easily on his knees and rolled over on his side and was soon dead."

A curious fact is revealed by a comparison of this entry with that of Audubon in his journal of the same date. The same thrilling story appears, printed almost sentence for sentence (with some change in wording) as told by Harris, as though the experience were Audubon's. Is it possible that faulty copying of the Audubon manuscript in preparation for its publication was responsible for the omission of credit to Harris?

July 29: "I should have mentioned that on Thursday morning at our encampment at the Trois Mamelles Bell shot a Titmouse very similar in its markings to the common Northern Chickadee, but which measures 7/8 of an inch more in length, than the measurements in Mr. Audubon's Syn., appears to us to have a larger tail and more white on the secondaries, and its note although very similar appears softer and less hurried in utterance."

Audubon failed to recognize it as anything new, and wrote as follows on July 27: "Bell went to skinning the birds shot yesterday, among which was a large Titmouse of the Eastern States." It did prove, however, to be the bird now known as the Long-tailed Chickadee, *Parus atricapillus septentrionalis,* and was described by Harris as *Parus septentrionalis* (*Proc. Acad. Nat. Sci. Phila.,* 11, 1845:300), the only bird ever described by him.

At the same time, Bell and Harris shot several sparrows which appeared to belong to a new species. Audubon described them and named them *Emberiza* [=*Ammodramus*] *bairdii,* Baird's Bunting, in honor of his young friend, Spencer Fullerton Baird, who had been invited upon the expedition and had had to decline. This was the last bird named, described, and figured by Audubon, the plate being the final one reproduced in the octavo edition of the Birds of America (1844).

The party left Fort Union on August 16 and arrived at St. Louis on October 19. Here the skins were divided up, and a supplemental Harris pocket diary for 1843 includes the following list as his share:

LIST OF BIRD SKINS PACKED BY SPRAGUE AND BELL FOR SHARE OF E. HARRIS AT ST. LOUIS

1 Wild Turkey
1 White-fronted Goose
1 Blue Heron
1 Sandhill Crane
2 Sharp-tailed Grous
10 Parrots
1 Magpie
8 M. Lark
5 Yellow-headed Troupials
2 Rusty Grackles
6 Black-headed Grosbeaks
12 Arkansas Flycatchers
9 Arctic Pipilos
13 Lark Finches
3 Rose-breasted Grosbeaks
1 Purple Martin
2 Cow Buntings
1 Rice Bird
1 Cardinal Bird
3 Say's Flycatchers
2 Cliff Swallows
2 Western Shore Larks
1 Baltimore Oriole
8 Sprague's Lark
4 Lincoln Finches
1 Muscicapa?
1 Finch?
1 Smith's Lark Finch
1 Chestnut-collared Bunting
4 Arctic Bluebirds
1 Golden-winged Warbler
1 Worm-eating Warbler
8 Shattuck's Bunting*
6 Rocky Mt. Wren
4 Lazuli Finches
4 White-crowned Sparrows
1 Hutchin's Goose
1 White Pelican
11 Pinnated Grous
2 Bell's Vireo
1 New Black-capped Titmouse
1 Young Snow Goose
2 Tennessee Warbler

* Clay-colored Sparrow.

OUT OF THE LIST SENT TO BELL IN EXCHANGE

3 Pinnated Grous
3 Arkansas Flycatcher
3 Lark Finch
2 Black-headed Grosbeak
2 Arctic Pipilos
1 Young-Rocky Mt. Wren

There are forty-two skins in the Harris collection which were contributed by Spencer Baird; twenty of these bear descriptive labels, and the remainder simply have labels in Baird's hand, noting the species but omitting dates and localities. Herbert Friedmann advises me that the twenty labelled skins were entered in the catalogues of the Smithsonian Institution and must therefore have been in Baird's possession after his coming to the Smithsonian in 1850. He also reports a statement in an old memorandum (listing specimens sent to various persons by Baird prior to his connection with the Institution) that in 1844 Baird sent seventy specimens to a Mr. Edward Harris. Of the Baird skins which do bear data, all but two were taken at Carlisle, Pennsylvania, his boyhood home, between 1842 and 1845, the exceptions being a Bachman's Sparrow (*Aimophila aestivalis bachmanii*), taken in 1845 at Savannah, Georgia, and a Western Bluebird (*Sialia mexicana occidentalis*), from California, undated, which was probably a Townsend skin. Baird, in a letter to his brother, William, in January 1844, mentions getting "a number of California duplicates from Cassin in the Academy" (W. H. Dall, 1915. "Spencer Fullerton Baird: A Biography," p. 108).

The most interesting Baird specimens are a Passenger Pigeon, *Ectopistes migratorius*, taken at Carlisle on October 19, 1844 (another Passenger Pigeon is unlabelled) and three *Empidonax* flycatchers, including two of Baird's own discoveries, the Yellow-bellied, *E. flaviventris*, and the Least, *E. minimus*. Both species were described by Spencer and William Baird in September 1843 (*Proc. Acad. Nat. Sci. Phila.*, 1:283–284), and my skins bear May labels of that year.

It would serve little useful purpose to list the entire 400 specimens which comprised the Harris collection as found, including the unlabelled birds and the French trade-skins. Those of particular interest, however, are as follows:

FROM JOHN K. TOWNSEND

1. *Leucophoyx thula brewsteri* (Snowy Egret), ♂, Walla Walla, Columbia River, July 3, 1836.
2. *Leucophoyx thula brewsteri* (Snowy Egret), Walla Walla, Columbia River, August 13, 1836.
3. *Perisoreus obscurus obscurus* (Oregon Jay), ♂, Columbia River, October 11, 1836 (on this date, Townsend was at Ft. Vancouver).

UNLABELLED SKINS, MOST OF WHICH MAY BE ATTRIBUTABLE TO THE TOWNSEND EXPEDITION

1. *Recurvirostra americana* (Avocet)
2. *Haematopus bachmani* (Black Oyster-catcher)
3. *Sphyrapicus varius ruber* (Red-breasted Sapsucker)
4. *Cinclus mexicanus unicolor* (Dipper)
5. *Ixoreus naevius* (Varied Thrush)
6. *Moho nobilis apicalis* (Double-plumed Moho)
7. *Hemignathus lucidus hanapepe* (Nukupu)
8. *Himatione sanguinea* (White-vented Honey-eater)
9. *Vestiaria coccinea* (Red Sickle-bill)
10. *Vestiaria coccinea* (Red Sickle-bill)

FROM THE MISSOURI RIVER TRIP

1. *Pedioecetes phasianellus* (Sharp-tailed Grouse), Ad., Fort Union, June 26, 1843
2. *Conuropsis carolinensis ludovicianus* (Louisiana Paroquet), Kickapou Country, Missouri River, May 3, 1843.
3. *Conuropsis carolinensis ludovicianus* (Louisiana Paroquet), Kickapou Country, Missouri River, May 4, 1843.
4. *Conuropsis carolinensis ludovicianus* (Louisiana Paroquet), Kickapou Country, Missouri River, May, 1843.
5. *Conuropsis carolinensis ludovicianus* (Louisiana Paroquet), Above Ft. Leavenworth, Missouri R., May 4, 1843.
6. *Conuropsis carolinensis ludovicianus* (Louisiana Paroquet), Unlabelled.
7. *Tyrannus verticalis* (Arkansas Kingbird), Ad. ♀, Fort Union, June 26, 1843.
8. *Anthus spraguei* (Sprague's Pipit), Ad. ♀, Fort Union, June 24, 1843.
9. *Sturnella magna* (Meadowlark), Illinois, April, 1843.
10. *Sturnella neglecta* (Western Meadowlark), Missouri River, 1843.
11. *Molothrus ater* subsp. (Cowbird), Ad. ♂, Fort Union, June 22, 1843.
12. *Pheucticus m. melanocephalus* (Rocky Mountain Grosbeak), Fort Union, June 22, 1843.
13. *Passerina amoena* (Lazuli Bunting), Ad. ♂, Fort Union, June 26, 1843.
14. *Spizella pallida* (Clay-colored Sparrow), Ad. ♀, Fort Union, June, 1843.

UNLABELLED SKINS, MOST OF WHICH APPEAR, THROUGH COMPARISON WITH LIST IN THE HARRIS 1843 DIARY, TO HAVE BEEN PROCURED ON THE MISSOURI RIVER TRIP

1. *Anser albifrons* (White-fronted Goose)
2. *Tympanuchus cupido pinnatus* (Greater Prairie Chicken)
3. *Meleagris gallopavo silvestris* (Eastern Wild Turkey)
4. *Pelecanus erythrorhynchos* (White Pelican)
5. *Tyrannus verticalis* (Arkansas Kingbird)
6. *Sayornis s. saya* (Say's Phoebe)
7. *Petrochelidon pyrrhonota albifrons* (Northern Cliff Swallow)
8-11. *Salpinctes o. obsoletus* (Rock Wren)
12. *Anthus spraguei* (Sprague's Pipit)
13. *Helmitheros vermivorus* (Worm-eating Warbler)
14. *Vermivora chrysoptera* (Golden-winged Warbler)
15. *Vermivora peregrina* (Tennessee Warbler)
16-19. *Xanthocephalus xanthocephalus* (Yellow-headed Blackbird)
20-22. *Pheucticus m. melanocephalus* (Rocky Mountain Grosbeak)
23. *Guiraca caerulea interfusa* (Western Blue Grosbeak)
24-27. *Pipilo maculatus arcticus* (Arctic Towhee)
28-34. *Chondestes grammacus* subsp. (Lark Sparrow)
35. *Spizella pallida* (Clay-colored Sparrow)
36-37. *Zonotrichia l. leucophrys* (White-crowned Sparrow)
38. *Melospiza l. lincolnii* (Lincoln's Sparrow)

SKINS WITH SPENCER F. BAIRD'S LABELS

1. *Ixobrychus e. exilis* (Least Bittern), No. 1522, ♀, Carlisle, Pa., May 20, 1844.
2. *Tringa flavipes* (Lesser Yellow-legs), No. 1505, ♂, Carlisle, Pa., May 10, 1844.
3. *Capella gallinago delicata* (Wilson's Snipe), No. 2119, ♀, Carlisle, Pa., April 16, 1845.
4. *Ectopistes migratorius* (Passenger Pigeon), No. 1726, Carlisle, Pa., Oct. 19, 1844.
5. *Zenaidura macroura carolinensis* (Eastern Mourning Dove), No. 2072, ♂, Carlisle, Pa., April 11, 1845.
6. *Coccyzus a. americanus* (Yellow-billed Cuckoo), No. 1537, Carlisle, Pa., May 17, 1844.
7. *Centurus carolinus* (Red-bellied Woodpecker), No. 794, Carlisle, Pa., Oct. 12, 1842.
8. *Empidonax flaviventris* (Yellow-bellied Flycatcher), No. 1004, ♂, Carlisle, Pa., May 20, 1843.
9. *Empidonax t. traillii* (Alder Flycatcher), No. 1013, Carlisle, Pa., May 24, 1843.
10. *Empidonax minimus* (Least Flycatcher), No. 999, Carlisle, Pa., May 20, 1843.
11. *Sitta canadensis* (Red-breasted Nuthatch), No. 857, ♂, Carlisle, Pa., Nov. 15, 1842.
12. *Turdus m. migratorius* (Eastern Robin), No. 2052, ♀, Carlisle, Pa., April 1, 1845.
13. *Sialia mexicana occidentalis* (Western Bluebird), No. 1244, California.
14. *Wilsonia citrina* (Hooded Warbler), No. 2246, ♀, Carlisle, Pa., May 7, 1845.
15. *Dolichonyx oryzivorus* (Bobolink), No. 1516, ♀, Carlisle, Pa., May 15, 1844.
16. *Dolichonyx oryzivorus* (Bobolink), No. 2297, ♂, Carlisle, Pa., May 21, 1845.
17. *Spinus t. tristis* (Eastern Goldfinch), No. 2203, ♂, Carlisle, Pa., May 20, 1845.
18. *Aimophila aestivalis bachmanii* (Bachman's Sparrow), No. 2402, Savannah, Ga., 1845.
19. *Spizella arborea* (Tree Sparrow), No. 1771, Carlisle, Pa., Jan., 1845.
20. *Passerella i. iliaca* (Eastern Fox Sparrow), No. 1288, ♀, Carlisle, Pa., March 11, 1844.

An additional twenty-two skins, all eastern birds, have Baird labels without descriptive data. These probably comprise a part of the early shipment which Baird mentions in a notebook.

Nine of the Harris birds are now in the collection of the Academy of Natural Sciences, having been donated by my father. These are the five Paroquets, a Passenger Pigeon, and three of Townsend's Hawaiian drepanids. Twenty-nine skins, mainly from the Lefevre group but including the *Hemignathus lucidus hanapepe,* are now in the Museum of Zoology, Princeton University. The Newark Museum has eighteen skins given them by my father in 1941 and has discarded twenty-three others "with Mr. Street's permission, evidently because of their condition."

The remainder of the Townsend, Missouri River, and Baird specimens listed herein will go to the Academy of Natural Sciences of Philadelphia with which Harris was so intimately associated. Harris gave many of his specimens to the Academy during his lifetime. The *Proceedings* for 1848 mention a gift of 119 skins. Among entries in the catalogues showing Harris donations are an American Magpie and a Bullock's Oriole from the Townsend Columbia River trip, a further indication that Harris may have had a considerable portion of the Townsend duplicates at one time.

I am indebted to Herbert Friedmann of the U. S. National Museum for information concerning the Baird specimens, to Herbert G. Deignan of that institution for his comments on the Hermit Warbler, to Rodolphe Meyer de Schauensee and James Bond of the Academy of Natural Sciences of Philadelphia for their assistance in the identification of several of the skins, and to Mr. Bond in particular for his many helpful suggestions on the preparation of this paper. Peter A. Brannon of the State of Alabama Department of Archives and History has kindly furnished me with much Harris information, including the hitherto unpublished list from the Gulf Coast Expedition.

520 Packard Building, Philadelphia 2, Pennsylvania

THE GOLDEN-FRONTED WOODPECKERS OF TEXAS AND NORTHERN MEXICO

BY ALEXANDER WETMORE

THE long series of Golden-fronted Woodpeckers *(Centurus aurifrons)* in the U.S. National Museum shows a definite cline between the birds from north-central Texas, which are lighter in color. above and below, and those from Jalisco, Michoacán, and Hidalgo in south-central Mexico, which are blacker on the dorsal surface and somewhat grayer underneath. These differences are most evident in fresh plumage, for with wear during spring and early summer the breast shows a darker gray and the upper surface decidedly more black. Among breeding specimens in worn condition, those from central and southern Mexico are definitely blacker than those from north-central Texas.

The extremes are easily separable, but in southern and southwestern Texas and in northeastern Mexico the two kinds of coloration merge so gradually that over a broad area the whole population is intermediate, making decision as to any sharply drawn dividing line difficult and in part arbitrary. Texas specimens from San Antonio and Seguin south to Corpus Christi and the Brownsville region, while somewhat intermediate, agree best with the southern group, as do those to the west as far as Eagle Pass on the Rio Grande. Beyond this point to the westward in Texas the lighter colored plumage prevails, and it presumably ranges also into northern Coahuila, since this is the coloration found along the Rio Grande River on the American side at Del Rio and Langtry. A good series from Fort Clark, collected by E. A. Mearns, also belongs in the lighter colored group. One male in worn plumage from Monclova, Coahuila, taken May 15, belongs with the darker, southern, form.

An increase of black markings in the white rump feathers is evident in skins of the southern group from San Luis Potosí (Jesús María, Ahualulco, Soledad, Hacienda Angostura) and Jalisco (Tupátaro). This tendency is almost absent from two specimens from Michoacán (Ocotlán) and is present in only part of the material at hand from Nuevo León.

The oldest name available for the birds under discussion, *Picus aurifrons* Wagler, 1829, based on a specimen from Ismiquilpam, Hidalgo, refers to the southern group, which will therefore be known as *Centurus aurifrons aurifrons* (Wagler). Two skins in the U.S. National Museum, from Tula, Hidalgo, are available for comparison. *Picus ornatus* Lesson (*Rev. Zool.* for April 1839, p. 102: from "Mexico," Abeillé Collection) is a synonym of *Centurus aurifrons*.

The northern race will take the name *Centurus aurifrons incanescens* Todd, originally restricted to the "Big Bend" area but now found to apply to the entire population of western and central Texas. Mr. Todd has kindly forwarded for examination the series of 10 skins (5 males and 5 females) on which he based his original description of this race. These differ from the more southern group in the characters outlined above. Other distinctions—variation in the depth of the yellow on the forehead and underparts and in the orange on the nape—mentioned as characters by Todd prove in the larger series now available to be individual variations.

Following is a résumé of the characters and ranges of the two groups:

Centurus aurifrons incanescens Todd. Northern Golden-fronted Woodpecker.

Centurus aurifrons incanescens Todd, Ann. Carnegie Mus., 30 (Dec. 16, 1946):298 (12 miles south of Marathon, Brewster County, Texas).

Subspecific characters.—Averaging lighter above, the dark crossbars narrower and the white ones correspondingly wider; the white of the rump and upper tail coverts nearly or completely immaculate; under surface slightly paler.

Range.—Western and central Texas from Eastland County south to the "Big Bend" area (near Marathon), Langtry, Comstock, Del Rio, and Fort Clark south probably to northeastern Chihuahua and northern Coahuila.

Centurus aurifrons aurifrons (Wagler). Wagler's Golden-fronted Woodpecker.

Picus aurifrons Wagler, Isis von Oken, 22, pt. 5 (May 1829): col. 512 (Ismiquilpam, Hidalgo).

Subspecific characters.—Averaging darker above, the dark crossbars wider and the white ones correspondingly narrower; the white of the rump and upper tail coverts usually more or less mixed with black; under surface slightly darker gray.

Range.—North-central Coahuila (Monclova) and southern Texas (Eagle Pass, San Antonio, Seguin) south to Jalisco (Ocotlán, Lagos), Michoacán (Pátzcuaro, Queréndaro), Hidalgo (Tula), and central Tamaulipas (Camargo, Forlón, Victoria, Soto la Marina).

SMITHSONIAN INSTITUTION, WASHINGTON 25, D.C.

GENERAL NOTES

A feeding habit of the Snowy Egret.—On April 25, 1947, I watched a Snowy Egret (*Leucophoyx thula*) feeding at the edge of a small pool along the road at Republiek, Surinam. The bird was in shallow water, standing on one foot, and with the other making rapid trembling movements in the water—the leg stretched forward, the toes and lower part of the tarsus submerged. It would stop suddenly, dabble rapidly in the water it had set in motion, and swallow something which I could not see. Then once more it would stretch one of its legs forward under the water and resume the vibrating movements. I could not make out whether the foot that was stretched forward rested on the mud or whether it was held in the water above it.

Portielje (1928. *Ardea*, 17:115) described foot trembling in captive Snowy Egrets in the Amsterdam Zoo, but from his account it appears that his birds trampled with both feet, as gulls do when feeding. The vibrating movement with one leg stretched forward is a regular feeding custom in small plovers and other wäders, but I have not seen it recorded in herons.—Fr. Haverschmidt, *Paramaribo, Surinam, Dutch Guiana.*

Swainson's Hawk nesting in north-central Oklahoma.—On June 29, 1948, I found a nest of Swainson's Hawk *(Buteo swainsoni)* two miles west of Stillwater in Payne County, Oklahoma. The nest, located about 25 feet above the ground in a hackberry tree, contained two eggs, one of which was pipped. The chick was alive and struggling to emerge. The following morning the parent birds did not put in an appearance when I revisited the area; the chick in the process of hatching was dead, and the other egg cold. Later, both adults appeared but did not fly near the nest nor dive down at me as they had on the previous afternoon. The pipped egg was crawling with ants, which may have caused the parents to desert. This is the first record of Swainson's Hawk nesting in Payne County and appears to extend the nesting range approximately 100 miles north and east of the known breeding range in Oklahoma.—F. M. Baumgartner, *Department of Zoology, Oklahoma Agricultural and Mechanical College, Stillwater.*

Sandhill Crane observed in southwestern Ohio.—On the afternoon of May 9, 1948, as Karl Maslowski, Gordon Acomb, and I were driving across the bottomlands of the Ohio River, 18 miles east of Cincinnati, Clermont County, Ohio, we observed a Sandhill Crane (*Grus canadensis*). The bird walked slowly across a dirt road about a hundred yards in front of us, giving ample time to observe its great size, dusty gray plumage, and (with 10-power binoculars) the bill and bald red forehead.

The Crane was foraging through corn and alfalfa fields bordering a slough formed by a recent flood of the Ohio River. We observed the Crane for over an hour, hearing its low rumbling croaks and seeing it make several short flights, its neck outstretched and legs trailing. During one of these flights Maslowski was able to take a recognizable photograph from a distance of 80 yards. As we followed the great bird across the fields, we discovered many of its tracks in the soft mud, some of which plainly indicated that the Crane had been in the area for several days.

Sandhill Cranes are rare migrants in Ohio; the last previous record, as far as I can determine, was made by Milton B. Trautman in Fairfield County on October 9, 1926 (1940. "The Birds of Buckeye Lake," p. 228). Louis W. Campbell (1940. "Birds of Lucas County," p. 66) listed the last known Ohio breeding record, for Huron County, Ohio, 1926. Frank Langdon (1879. *Jour.Cinn.Soc.Nat.Hist.*, 1:184) listed two Sandhill Crane specimens "reported to have been taken" in the vicinity of Cincinnati.—Haven H. Spencer, *Turpin Lane, Newtown, Ohio.*

Incubation of the Upland Plover.—On April 29, 1948, at about 11:00 a.m., we found two nests of the Upland Plover (*Bartramia longicauda*) at the Game Farm of the Ohio Division of Conservation and Natural Resources, six miles north of Urbana, Champaign County, Ohio.

The nests were approximately 200 yards apart in a strip of timothy and sweet clover. Each contained two eggs. At the time of discovery a plover flushed from the first nest; the second was unattended. We checked the nests again at about 4:00 p.m. the same day. The first still contained two eggs; the second contained three. A fourth egg was later deposited in the second nest, probably on April 30. (A set of four was also later completed in the first nest.)

Two eggs in the second nest were pipped by 6:00 p.m. on May 24. The caps of all four eggs appeared ready to be pried open when we last examined them, at 6:00 p.m. on May 26. Four dry chicks were in the nest the next morning. If our assumption of a date (April 30) for the laying of the fourth egg is correct and the bird started incubating May 1, then 26 days were required for incubation. Similarly, two eggs in the first nest were pipped May 25. We last examined them the morning of May 27 and we are confident (judging from their condition then) that they hatched that day. Incubation periods of 17 to 24 days have been recorded for the Upland Plover. Most observations indicate that the period is 21 days (see Buss and Hawkins, 1939. *Wils. Bull.*, 51:202–220).

No mention is made in any literature we have read about both sexes incubating. We witnessed an exchange at 3:30 p.m. on May 25; the incubating bird arose at the approach of its mate and departed as the mate settled on the eggs. On May 26 one bird came to the nest as though to relieve the sitting bird, but the incubating plover pecked at it a few times, and it walked away.—Woodrow Goodpaster and Karl Maslowski, *Museum of Natural History, Cincinnati, Ohio.*

The Mourning Dove in Alaska.—Though the Mourning Dove (*Zenaidura macroura*) has been recorded in Alaska, its occurrence that far north is decidedly rare. The A.O.U. Check-list (1931) states: "Breeds in western and interior North America from Minnesota, western Arkansas, and Oklahoma to the Pacific coast, north to Manitoba, Saskatchewan, and British Columbia, and south throughout Mexico. Winters south to western Panama. Casual at Fort Yukon, Alaska." As would be expected, most of the Alaskan records are for the extreme southern coastal strip. A few stragglers, however, have been noted inland and far to the north.

The nine published records (north to south) are as follows:

Fort Yukon (northeastern interior, just north of the Arctic Circle): male collected by Thomas E. Winecoff on October 9, 1916 (Friedmann, 1931. *Auk*, 48:265).

Juneau (southeastern coast): one seen near the city by Allen Hasselborg in November 1911 (Swarth, 1922. *Univ.Calif.Publ.Zool.*, 24:210).

Sitka (Baranof Island, southeastern coast): male collected near city by Merrill on September 14, 1912 (Willett, 1914. *Condor*, 16:81); one Mourning Dove observed for several hours on September 9, 1940 (Webster, 1941. *Condor*, 43:121).

Sergief Island (southeastern coast): an adult female (tentatively identified as *carolinensis*) collected on September 3, 1919 (Swarth, 1922. *Univ.Calif.Publ.Zool.*, 24:209).

Stikine Flats (near Wrangell, southeastern coast): two observed at a ranch for three weeks of September 1920 (Willett, 1921. *Condor*, 23:158).

Wrangell (southeastern coast): one Mourning Dove seen near a house for most of the summer of 1902 (Willett, 1921. *Condor*, 23:158); Fred H. Gray, who had observed and collected birds for many years, saw Mourning Doves in and about the city "on several occasions" (Swarth, 1922. *Univ.Calif.Publ.Zool.*, 24: 210).

Hydaburg (Prince of Wales Island, southeastern coast): one Mourning Dove seen on September 1, 1916 (Willett, 1917. *Condor*, 19:22).

The files of the U.S. Fish and Wildlife Service contain eight records of Mourning Doves in Alaska which apparently have not been published previously. Among these is one from the cold interior. They are (from north to south) as follows:

Clear (interior, southwest of Fairbanks, about two degrees south of the Arctic Circle): William J. Tirre reports (memorandum, October 17, 1947) that a dove, captured by Mr. and Mrs. Paul Waugh at their home in Clear during a severe snowstorm on September 30, 1947, and later transported to the Woodland Park Zoo at Seattle, Washington, has been identified as a Western Mourning Dove (*marginella*).

Juneau: Frank Dufresne records (field notes) one Mourning Dove on a highway nine miles from the city in August 1942.

Taku Lodge (southeastern coast): Frank Dufresne reports (field notes) one dove seen from July to September 1940.

Twin Glacier Camp on Taku River (southeastern coast): Frank Dufresne reports (letter, October 3, 1929) a single Mourning Dove—"Carolina Dove (*Zenaidura macroura*)"—on October 2, 1929.

Sitka: Ernest P. Walker states (letter, August 21, 1926) that E. M. Goddard, writing on July 20, reported a Mourning Dove that appeared near the city about the end of May 1926 and remained about a month; Frank Dufresne reports (field notes) a single dove seen at Sitka in July 1938.

Kake (Kupreanof Island, southeastern coast): Frank Dufresne reports (field notes) that two doves were seen during July and August 1942.

Goddard Hot Springs (Baranof Island, southeastern coast): Frank Dufresne writes (letter, October 3, 1929) that E. M. Goddard observed a Mourning Dove ("a bird of the same type") at the Springs.

It will be noted that only one of these doves was observed as early as May, whereas five were recorded during July and August. That the majority of the birds were fall wanderers may be seen from the fact that seven were observed in September, one in October, and one in November. All but two of the records were made in the humid southern coastal strip, where temperatures are rarely low.—CLARENCE COTTAM, *U.S. Fish and Wildlife Service, Washington 25, D.C.*

Breeding of Richmond's Swift in Venezuela.—In a recent paper (*Univ. Mich. Mus. Zool. Occ. Papers No.* 505, Jan. 14, 1948) William H. Phelps and I reported the occurrence of Richmond's Swift, *Chaetura vauxi richmondi*, in Venezuela. The "seasonal range" of the 26 specimens we discussed indicated that the species was non-migratory, and "the fact that all 10 specimens taken at Curupao in July had much enlarged gonads and virtually no tail spines" led us to suppose that it bred there. Mr. Phelps recently has obtained full confirmation of this supposition. In a letter dated February 21, 1948, he wrote that his grandson, who has a home at the Country Club in Caracas (1,000 meters), captured an adult male (Phelps Collection No. 40979) and a young of undetermined sex (No. 40980) in the living room of his house. They had come in through the fireplace and chimney, where they presumably had a nest.

The young bird was only partly grown. The blood-sheaths at the base of the rectrices were about 11 mm. long, and those at the base of the remiges about 14 mm. long. The wing of the adult measured 113 mm., the tail 33 (the spines were completely worn off). The wing of the young bird measured 81, the tail 29 (the spines, apparently unworn, were about 3 mm. long).

W. E. Clyde Todd informs me that within recent years he has handled and identified nine Venezuelan specimens of Richmond's Swift, of which eight are now at the Carnegie Museum and one at the U. S. National Museum. These nine

specimens were from the Sierra de Carabobo, Colonia Tovar, and Petare. They were collected on April 8, 1929 (two); April 30, 1929 (two); July 2, 1914 (one); July 22, 1929 (one); July 26, 1929 (two); and July 28, 1929 (one)—dates which certainly suggest breeding.

I wish to thank both Mr. Phelps and Mr. Todd for the information on which the above note is based.—GEORGE MIKSCH SUTTON, *University of Michigan Museum of Zoology, Ann Arbor.*

Wheatear at Peekskill, New York.—On November 15, 1947, I had the good fortune to observe a Wheatear (*Oenanthe oenanthe*) on a railroad embankment at Peekskill, New York, and carefully studied it at close range. Since I was familiar with Wheatears in life, this bird's diagnostic color and shape, perky, bobbing mannerisms, conspicuous white rump, and jerky black-bordered tail made me immediately certain of what I had found.

This species is only of accidental occurrence in the United States, and I know of but five other records for the New York City region: Griscom (1923. "Birds of the New York City Region") listed three specimens collected on Long Island, the last near Jamaica, in 1885; one Wheatear was seen with a flock of Snow Buntings at Montauk, Long Island, on December 27, 1936, by L. Breslau (*Proc. Linn. Soc. N.Y.* No. 50–51, 1940:48); another was carefully studied at Moriches Inlet, Long Island, on June 3, 1941, by LeRoy Wilcox.—ALLAN D. CRUICKSHANK, *Rye, New York.*

Cardinals bathing.—Here in Bluefield, West Virginia, the Cardinal *(Richmondena cardinalis)* lives very close to us, and I was much interested by Mrs. Laskey's article (1944. *Wils. Bull.*, 56:27–44), especially by the statement that Cardinals are not bathers. Since then I have kept a record of our bathing Cardinals, which is continuous (April 1944–May 1948) except for six months in 1946.

The Cardinals bathe mostly from January through June. I also have single records of males for July through October, but none at all for November. Judging from my records, twice as many males bathe as females. In 1947–48, I recorded males bathing five times in February and May, six times in April; females bathing six times in February, three times in April.

The Cardinals bathe when there is deep snow on the ground, as well as during hot dry weather. The favorite time of day is between noon and three o'clock, though they also bathe around 8:00 a.m. and after 6:00 p.m., especially in May and June. They do not bathe together but in succession. Male usually follows female, and often each returns for a second splash. They bathe with English Sparrows *(Passer domesticus)*, though perhaps from necessity rather than from choice.

The largest number of bathers was recorded on December 23, 1945, when five males and two females followed one after the other. Two more approached but were frightened away. There was five feet of snow on the ground, temperature 34° F. (time not noted). On February 1, 1948, four males and one female bathed with a host of sparrows in and out. This was at 12:30 p.m., with two feet of snow, temperature 32° F.

One episode of the bath is worth mentioning. On April 26, two male Cardinals attempted to join a female Cardinal in the bath. She rose protesting and called repeatedly. The males continued to splash until the female's mate arrived and drove at them, when they left hurriedly without protest. Then the attacking male took a bath, after which the female resumed her ablutions and he, having dried his feathers, flew to the rose bush and sang his full-throated *purty-purty*. —MIRIAM G. DICKINSON, 2006 Reid Avenue, Bluefield, West Virginia.

EDITORIAL

James Boswell Young has found it impossible to continue as Secretary of the Club and Chairman of the Program Committee. To fill these vacancies until the next regular election of officers, the Executive Council has appointed Harold Mayfield of Toledo, Ohio.

Our printers make every effort to see that everyone on the mailing list receives a perfect *Bulletin*, but occasionally a defective one slips by. Please check your *Bulletins* immediately on their arrival for errors in sequence of pages, soiled or crumpled sheets, and other defects. Return any defective copy to the Editor, and it will be replaced. Further, if the addressing machine slips, your *Bulletin* may fail to reach you. In such case, please notify the Editor promptly so that he may send you a copy.

OBITUARY

Albert Kenrick Fisher, a Founder of the American Ornithologists' Union, died in Washington, D.C., on June 12, 1948, at the age of ninety-two. Although trained in medicine, he early turned his attention to ornithology, and in 1885 was, with his chief, C. Hart Merriam, a founder of the "Section of Ornithology" of the U.S. Department of Agriculture Division of Entomology (the "Section" later becoming the Bureau of Biological Survey and finally a part of the Fish and Wildlife Service). The importance of his work in economic ornithology and in the study of animal distribution was recognized by his election to the presidency of the American Ornithologists' Union in 1914. A list of his scientific contributions (some 150 notes, reviews, articles, and bulletins) was published in the *Proceedings of the Biological Society of Washington* (39:21–28) on his seventieth birthday, March 21, 1926.

Frederick Woods Haecker, engineer and ornithologist, died March 23, 1948, in Salt Lake City at the age of forty-five. He was a graduate of the Colorado School of Mines but became a river engineer on the Missouri. From 1941 to 1946 he edited *The Nebraska Bird Review*, and he was senior author of the most recent check-list of the birds of Nebraska (1945). He had been a member of the Wilson Ornithological Club for thirty years and was Chairman of its Committee on Affiliated Societies.

Edwin Lincoln Moseley, Professor Emeritus of Biology at Bowling Green State University (Ohio), died June 6, 1948, aged eighty-three. In 1885 he received the A.M. degree from the University of Michigan, and in 1887 went to the Philippines with the Steere Expedition. He afterward described two new flycatchers which he discovered there (*Ibis*, 1891), and his name was given to a kingfisher, *Halcyon lindsayi moseleyi* (Steere), from Negros Island. He was head of the Department of Biology of Bowling Green State University from 1914 until his retirement in 1936. In 1932 he served as Vice-President of the Wilson Ornithological Club.

ORNITHOLOGICAL NEWS

Jean Delacour has been elected an Honorary Member and Ernst Mayr a Foreign Member of the British Ornithologists' Union.

Gustav Swanson, formerly Treasurer of the Wilson Ornithological Club, will be the head of the newly organized Department of Conservation at Cornell University.

Richard H. Pough has been appointed Curator of Conservation and Use of Natural Resources at the American Museum of Natural History.

Dwain W. Warner has taken the editorship of *The Flicker*, official organ of the Minnesota Ornithologists' Union.

WILSON ORNITHOLOGICAL CLUB ANNOUNCEMENTS

The Wilson Ornithological Club, formerly an associate, is now an affiliate, society of the American Association for the Advancement of Science.

As an affiliated society we have the privilege of nominating a member of the Club who is also a fellow of the Association to represent the Club on the Association Council.

Several years ago, the Wilson Ornithological Club contributed to the support of the Committee for the Preservation of Natural Conditions, of the Ecologists' Society of America. The work of this committee has now been transferred to the recently-established Ecologists' Union, and we have received an invitation to join that organization.

By a unanimous vote of the Executive Council, the Wilson Ornithological Club has accepted institutional membership and will contribute four dollars annual membership fee.

In memory of S. Morris Pell, talented bird artist, one hundred dollars has been given to the Wilson Ornithological Club. The donor, who wishes to remain anonymous, has requested that the gift be used to help promising young bird artists. President Pettingill has asked the Research Committee to make the award.

NEW LIFE MEMBER

EUGENE EISENMANN, President of the Linnaean Society of New York, received degrees from Harvard College and the Harvard Law School and is now a practicing lawyer in New York City. His particular avocational interests are in conservation of natural resources and the avifauna of Panama, where, as a child, he first became interested in birds. He is a member of several scientific societies and has published a number of articles and notes in ornithological journals. Members of the Wilson Ornithological Club will remember the stimulating article on vernacular nomenclature which Mr. Eisenmann wrote jointly with Hustace H. Poor and published in the December 1946 issue of the *Bulletin*.

ORNITHOLOGICAL LITERATURE

Bird Recognition, I: Sea-Birds and Waders. By James Fisher. Penguin Books, Harmondsworth, Middlesex, England, 1947: 4½ × 7⅛ in., 190 pp., with 114 figs. by Fish-Hawk, 77 maps (mainly by W. B. Alexander) and 72 charts. Paper. 2*s* 6*d*. ($.75 in U.S. bookstores).

This is the first in a series of three pocket-size books, which together will comprise a field-guide to the birds of the British Isles. Although the title might lead one to expect them, ducks, geese, herons, and rails are not included in this volume. The volumes to be published later will cover "game birds, waterfowl, and birds of prey" and "perching and singing birds."

This first volume has special interest for Americans because many of the birds described, or closely related species, are found on our continent.

In the main body of the book, Fisher treats 72 sea birds and shore birds ("waders" in British usage). For almost every species there is a page of text facing a picture of the bird, a map showing the bird's distribution in Britain, and a "year-cycle" chart telling its status at each season. A remarkable amount of information, going far beyond mere field identification, is compressed into a page of text under the headings: "Recognition," "Breeding" (if the bird nests or has nested in Britain), "Distribution," "Movements," and "To Read."

The introduction carries a conventional key to identification and a key to the habitats in which the birds are to be found when away from their breeding places. The habitat key is in tabular form, one table for sea birds and another for shore birds, listing the species at the left and indicating preferred habitats by blocks in the proper columns.

At the close of the book, without an introductory heading, there are 11 pages of pictures of shore birds, terns, and gulls in flight, showing mostly the winter or immature plumages of birds figured in breeding plumage elsewhere in the book. There are also a list of the 52 species that have been recorded less than 100 times in Britain and an index.

The main purpose of the volume is to assist the amateur in identifying birds in the field. That aim is accomplished exceedingly well. The comments on recognition are clear and practical, giving special attention to the characters that distinguish similar species. Further, the large amount of information about nesting, migration, and history of the various species, so neatly condensed in this little book, will make it useful as a reference work to many people who do not need it as a field guide; it will be especially useful to those who do not have access to Witherby's five-volume "Handbook of British Birds," which Fisher acknowledges as his principal source. Throughout much of the book Fisher has expressed himself in simply-worded phrases instead of in complete sentences; thus, without sacrifice of clarity, he has achieved a compactness of text particularly appropriate to a handbook of this kind.

The half-tone figures are skillfully done and, although in sepia, they are adequate to their purpose, particularly for this group of birds, in which color details are relatively unimportant for field identification.

The "year-cycle" chart is an ingenious adaptation of the familiar "pie chart." The weeks, months, and seasons are shown clockwise around the rim, and sectors are marked out within the dial to indicate the status of the bird at any time of the year. Thus, on a circle of 2¼-inch diameter, Fisher presents a summary which, in the case of the Woodcock, for example, supplies approximate dates for the following: birds in winter quarters; assembly of residents; early, main, and late passage of foreign birds in spring; eggs, first and second brood; early, main, peak, and late passage of foreign birds in fall; dispersal and passage of residents.

An interesting feature of the distribution maps is the use of the "vice-county" unit in blocking out (by solid color and shadow) the breeding areas and the areas

of non-breeding occurrence. Since the political divisions of Britain vary greatly in size and internal complexity, the vice-county system has been created to divide the counties into smaller areas of "roughly equal [biological] importance." However, the distribution maps are so small in this book that it would be difficult for the reader to identify the exact geographical location of some of the vice-counties of the interior.

The birds are arranged in the order of the British Check-list, which differs considerably from the order of the A.O.U. Check-list. The reader interested in the relationships among birds will notice also that the British scientific names differ from the American for some genera and species.

The inexpensiveness of this book should encourage its sale. However, the low price has been achieved partly through the use of pulp paper of low durability; better resistance to moisture and scuffing would be an advantage in a pocket field guide.

Incidentally, although the title page gives 245 Fifth Avenue, New York, as the American address of the publisher, the book is not obtainable there.

This excellent little book is another reminder of the high state of development of amateur bird study in England.—Harold Mayfield.

THE BIRDS OF NANTUCKET. By Ludlow Griscom and Edith V. Folger. Harvard University Press, Cambridge, 1948: 5½ × 7½ in., 156 pp., 17 photos, map. $3.25.

This book "is the first of a series of faunal studies from areas of Massachusetts which are of exceptional interest for the variety and abundance of their bird life and the excellence of the historic record."

Nantucket island was early known as a paradise for sea and waterfowl, and there is a long record of its importance to sportsmen. This has been documented in part through publication by the late John C. Phillips of the "Shooting Journal of George Henry Mackay, 1865–1922" (Cosmos Press, Cambridge, Mass., 1929). The record of the non-game species, however, is not so clear, despite the occasional visits of such distinguished naturalists as T. M. Brewer, John C. Phillips, J. A. Allen, J. H. Farley, W. Sprague Brooks, E. H. Forbush, and the authors of the present volume. These last freely admit that there remains much to be learned about the bird life of this and other islands of the northeast. To emphasize the point they list nine "ornithological problems" that they recommend to the attention of bird students visiting Nantucket.

The fact that Nantucket is not on a regular land-bird migration route adds much interest to the rather large number of species that have been listed. Many of these were recorded by Miss Folger, who resided on the island for three full years and who had access to material in the files of the Maria Mitchell Association. Mr. Griscom, on the other hand, has had access to unpublished journals and diaries, and has examined specimens in the principal museum collections. The work covers not only Nantucket but also the smaller islands of Tuckernuck and Muskeget to the west.

The Introduction discusses the physiographic and climatic features and the land-bird migrants, gives an "historical summary," and notes the changes that have taken place in the bird life of the island. This is followed by a systematic list that differs in at least one respect from the usual list: it makes a special point of indicating what is not known. The list contains 274 species, of which 132 are land-birds.

The book is admirably written and may well serve as a model for future reports on insular avifaunas. The photographs used as illustrations are from the files of the National Audubon Society. The report is indexed and concludes with a bibliography.—Frederick C. Lincoln.

WING TO WING. By E. H. Ware. Illustrated with 26 original photographs by the author and 26 line drawings by Roland Green. Harper & Brothers, New York, 1946: 5½ × 6¾ in., 159 pp. $2.75.

During the recent war, E. H. Ware was able to continue his hobby of bird finding while serving with the Royal Air Force in Britain, Algeria, Tunisia, and Corsica. His objective was to make a "memory-collection" of the various species occupying countries where he was stationed. This book is a record of his accomplishment.

Mr. Ware relates with enthusiasm coupled with gentle humor his experiences in seeking species new to him. When each species is ultimately before him, he describes in an earnest, straightforward manner his first impressions. Especially good reading are the two chapters concerning his stay at Bordj Menaiel, Algeria, near the foothills of the Atlas Mountains. This French-Arab village and its countryside presented a peculiar mixture of friendliness and suspicion, of ancient and modern living, of squalor and prosperity. Confronted with such a situation his exploits for birds were occasionally exciting and not infrequently amusing. Also good reading are the chapters dealing with adventures in the highlands of Scotland and Corsica, where scenic beauty rivalled the birds for his attention.

"Wing to Wing" is not, and is not intended to be, a contribution to ornithology. It is written for persons who, like the author, genuinely enjoy bird finding as an end in itself. Roland Green's drawings adequately depict some of the rarer or more interesting birds which the author "collected." There is an index to all species mentioned in the text.—Olin Sewall Pettingill, Jr.

AMERICAN BIRDS IN COLOR. LAND BIRDS. By Hal H. Harrison. Wm. H. Wise & Co., New York, 1948: 6⅝ × 9¾ in., xxiv + 486 pp. $5.00.

Mr. Harrison has written good, brief accounts of the land birds of the United States and has added a recognition chart, in which birds are arranged by size and color, and distribution charts, in which birds are listed alphabetically under different regions. In the introduction he tells of the pleasures of bird watching and recommends five field guides, as well as Hickey's "Guide to Bird Watching."

There are 195 photographs in black and white taken by various people; many of these are good, but others exhibit pathetic specimens of stuffed birds. Of the 192 color photographs, a few are excellent; but with the majority, something has gone wrong in the reproduction process, and many of the pictures are too blue or too pale. I fear the author's efforts to help people recognize birds will be nullified by his publishers, who show the Scaled Quail, White-winged Dove, Mockingbird, and Broad-winged Hummingbird with almost no color at all, solid green-blue California Quail, blue and white Sparrow Hawks, pink Brown Thrashers, a blue Bank Swallow, and a brown and white Violet-green Swallow. These and many others of the color photographs, as well as the illustrations of mounted specimens, are worse than useless; they give false and (in the case of the mounted specimens) repulsive impressions of the birds. I cannot agree with the claim on the cover that "text and captions tell you everything you need to know about each bird," nor that this is "the most beautiful, colorful bird book ever created."—Margaret M. Nice.

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